Modular Reconfigurable C4I Interface (MRCI) Phase 1

Preliminary Design Review (PDR)

PDR Agenda (1 of 4)

Time	Subject
0800-0815	Welcome and Introductions
0815-0900	Programmatic Issues
0900-0915	MRCI Background and PDR Objectives
0915-0945	MRCI General and Technical Requirements Review
0945-1000	BREAK
1000-1100	Mission Threads by Experiment
	- Experiment #1 CTAPS/TBMCS-AWSIM/R
	- Experiment #2 CTAPS/TBMCS-AFSAF
	- Experiment #3 MCS-AFATDS-CBS
	- Experiment #4 MCS-AFATDS-ARSAF
1100-1130	MRCI Requirements Allocation to Functions
	- Message Subset to be Used

PDR Agenda (2 of 4)

Time	Subject
1130-1230	LUNCH
1230-1300	MRCI Preliminary Design Overview
	- Global View of MRCI Architecture and its Operational Context within an High Level Architecture (HLA) Federation
	- Global View of MRCI Configuration Item (CI) Architecture
1300-1330	MRCI Configuration Item Functional Design
	- System-Specific Interface CI
	- Requirements Allocation
	- Preliminary Computer Software Components (CSCs)
	- Internal CSC Connection Topology
	- Inter/Intra CSCI and CSC Interface Characterizations

PDR Agenda (3 of 4)

DMSO

Time	Subject
1330-1400	MRCI Configuration Item Functional Design
	- Reconfigurable Modules CI
	- Requirements Allocation
	- Preliminary Computer Software Components (CSCs)
	- Internal CSC Connection Topology
	- Inter/Intra CSCI and CSC Interface Characterizations
1400-1430	MRCI Configuration Item Functional Design
	- RTI Interface Manager CI
	- Requirements Allocation
	- Preliminary Computer Software Components (CSCs)
	- Internal CSC Connection Topology
	- Inter/Intra CSCI and CSC Interface Characterizations
1430-1445	BREAK

PDR Agenda (4 of 4)

DMSO

Time	Subject
1445-1515	Experiment-Level Functional String Walkthrough
	-Data-Information-C2 Transactions
1515-1530	MRCI Graphical User Interface Concept
1530-1600	MRCI External Interface Characterizations
	- C4I System Side
	- RTI Side
	- Provisions for High Time-Bandwidth Product Transactions
1600-1615	System Engineering Management Plan Update and Program Activities Plan Review
1615-1630	Summary with Action Items Definitization and Assignment
1630	Adjourn

PDR Agenda (1 of 4)

DMSO

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Welcome by Lt. Col. Jefferson, DMSO

Briefing of Project Background and Current Status

Under Separate Cover

PDR Agenda (1 of 4)

DMSO

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Briefing by Tom Tiernan, NRaD

Under Separate Cover

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PDR Objectives

- Evaluate progress, consistency and technical adequacy of the selected top-level design approach (Guidance from MIL-STD-1521B, Paragraph 3.4).
- Evaluate compatibility between MRCI system requirements and preliminary CSCI design (Guidance from MIL-STD-1521B, Paragraph 3.4).
- Communicate key aspects and critical task dependencies of MRCI post-PDR schedule.

PDR Agenda (1 of 4)

DMSO

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MRCI General and Technical Requirements (1 of 13)

DMSO

1. MRCI execution should be transparent to the user and non-intrusive to the C4I system during setup and use.
2. MRCI shall be able to operate in real time and/or at a speed which results in the perception of real time (perceptible real time) to the C4I system using the MRCI. MRCI must not preclude or inhibit the use of time management schemes supported by the RTI.
3. MRCI shall operate with dynamic changes in C4I systems task organization and in all mission threads (e.g. planning through BDA and replanning to retasking).
4. MRCI shall operate during, and recover from, system failures on either its RTI or live C4I side.
5. MRCI shall support C4I systems representing echelons above Corps to platform level, e.g. infantryman operating autonomously.

MRCI General and Technical Requirements (2 of 13)

DMSO

6. MRCI shall not restrict the HLA Federation operations with respect to security level.
7. MRCI operation shall not be constrained by data, information or C2 formats and shall not introduce additional layers of complexity to the simulation interfaces to the RTI.
8. MRCI shall be able to go to war and operate across operational warfighting networks.
9. MRCI shall support bi-directional interactions between C4I systems and the HLA-based Federation.
10. MRCI shall comply with the five Federation and five Federate rules of the HLA.

10.1 Federations must have an HLA Federation Object Model (FOM), documented using the HLA OMT.

MRCI General and Technical Requirements (3 of 13)

DMSO

10.2 In a federation, all object representation (ownership or reflection) occurs in the federates, not in the runtime infrastructure (RTI).

10.3 During a federation execution, data exchange (attribute values and interactions) among instances of objects defined in the FOM represented (owned or reflected) in different federates occurs via the RTI).

10.4 During a federation execution, federates must interact with the runtime infrastructure (RTI) in accordance with the HLA interface specification.

10.5 During a federation execution, an attribute of an instance of an object can be owned by only one federate at any given time.

10.6 Federates must have an HLA Simulation Object Model (SOM) documented using the HLA OMT.

MRCI General and Technical Requirements (4 of 13)

DMSO

10.7 Federates must be able to publish/reflect any attributes of objects in their SOM and exercise SOM object interactions externally.

10.8 Federates must be able to own or reflect attributes and to transfer/accept ownership of attributes dynamically during a federation execution, as specified in their SOM.

10.9 Federates must be able to vary the conditions (e.g. thresholds) under which they provide updates of public attributes of objects according to their SOM.

10.10 Federates must be able to manage local time in a way which will allow them to coordinate data exchange with other members of a federation in accordance with at least one HLA time management service.

MRCI General and Technical Requirements (5 of 13)

DMSO

11. MRCI must facilitate interoperation with an HLA federation using all five RTI service categories. i.e. Federation Management, Time Management, Object Management, Ownership Management and Declaration Management.
12. MRCI shall provide the throughput and transport capabilities to facilitate the rapid exchange and synchronization of C4I and Simulation databases (database reconciliation) as executed by the future HLA exercise generation components.
13. MRCI shall facilitate the collection of both FOM and non-FOM data as defined within the C4I system SOM.
14. MRCI shall facilitate the establishment of an application-to-application session between the RTI and the C4I system.

MRCI General and Technical Requirements (6 of 13)

DMSO

15. MRCI shall provide a mechanism for resynchronization with C4I systems following degraded operations (e.g. tactical picture re-establishment).
16. MRCI shall be GCCS DII COE compliant. See following viewgraphs for compliance categories and compliance levels within categories. Degree and extent of compliance will be presented at PDR.
17. MRCI applications shall be fully interoperable with Ada 95.
18. MRCI shall support next generation releases of C4I system software (e.g. MCS/P Baseline Build V, Block III; AFATDS V1.0.06).
19. The MRCI/C4I SOM shall support FOMs produced for STOW demonstrations and exercises which include CBS, OpenSAF, EADSIM participation and entity-level interactions.

DII COE Compliance (1 of 3)

DMSO

Compliance Principles

Full COE compliance embodies the following principles:

1. All segments shall comply with the guidelines, specifications, and standards defined in this document and related documents such as the *Style Guide*.
2.. All software and data shall be structured in segment format.
3. All segments shall be registered and submitted to the on-line library.

DII COE Compliance (2 of 3) DMSO

Full COE compliance embodies the following principles (cont.):

4. All segments shall be validated with the VerifySeg tool prior to submission, and shall successfully pass the VerifySeg tool with no errors. An annotated listing of the VerifySeg tool output shall be submitted with each segment release.
5. All segments shall be loaded and tested in the COE environment prior to submission. Segment developers are responsible for testing their segment within the full COE, but there is no requirement to include mission application segments for which there is no dependency.
6. All segments shall fully specify dependencies and required resources through the appropriate segment descriptors.

DII COE Compliance (3 of 3)

DMSO

Full COE compliance embodies the following principles (cont.):

7. All segments shall be designed to be removable, and tested to confirm that they can be successfully removed from the system.
8. All segments shall access COE components only through the published APIs, and segments shall not duplicate functionality contained within the COE.
9. No segment shall modify the environment or any files it does not own except through environment extension files or through use of the installation tools provided by the COE.

DII COE
Compliance Categories (1 of 2)

DMSO

Category 1: Runtime Environment (RTE). This category measures how well the proposed software fits within the COE executing environment, and the degree to which the software reuses COE components. It is an assessment of whether or not the software will "run" when loaded on a COE platform, and whether or not it will interfere with other segments.

Category 2: Style Guide. This category measures how well the proposed software operates from a "look and feel" perspective. It is an assessment of how consistent the overall system will appear to the end user. It is important that the resulting COE-based system appear seamless and consistent to minimize training and maintenance costs.

DII COE
Compliance Categories (2 of 2)

DMSO

Category 3: Architectural Compatibility. This category measures how well the proposed software fits within the COE architecture (client/server architecture, DCE infrastructure, desktop, etc.). It is an assessment of the software's potential longevity as the COE evolves. It does *not* imply that all software must be client/server and RPC (Remote Procedure Call) based. It simply means that a reasonable design choice has been made given that the COE is client/server based and is built on top of a DCE (Distributed Computing Environment) infrastructure.

Category 4: Software Quality. This category measures traditional software metrics (lines of code, McCabe complexity metric, etc). It is an assessment of program risk and software maturity.

RTE Compliance Levels (1 of 3)

DMSO

Level 1: Standards Compliance Level. A superficial level in which the proposed capabilities share only a common set of COTS standards. Sharing of data is undisciplined and minimal software reuse exists beyond the COTS. Level 1 may allow simultaneous execution of the two systems.

Level 2: Network Compliance Level. Two capabilities coexist on the same LAN but on different CPUs. Limited data sharing is possible. If common user interface standards are used, applications on the LAN may have a common appearance to the user.

Level 3: Workstation Compliance Level. Environmental conflicts have been resolved so that two applications may reside on the same LAN, share data, and coexist on the same workstation as COE-based software. The kernel COE, or its equivalent, must reside on the workstation. Segmenting may not have been performed, but some COE components may be reused. Applications do not use the COE services and are not necessarily interoperable.

RTE Compliance Levels (2 of 3)

Level 4: Bootstrap Compliance Level. All applications are in segment format and share the bootstrap COE. Segment formatting allows automatic checking for certain types of application conflicts. Use of COE services is not achieved and users may require separate login accounts to switch between applications.

Level 5: Minimal COE Compliance Level. All segments share the same kernel COE, and functionality is available via the Executive Manager. Boot, background, and local processes are specified through the appropriate segment descriptor files. Segments are registered and available through the on-line library. Applications appear integrated to the user, but there may be duplication of functionality and interoperability is not guaranteed. Segments may be successfully installed and removed through the COE installation tools.

Level 6: Intermediate COE Compliance Level. Segments utilize existing account groups, and reuse one or more COE component segments. Minor documented differences may exist between the *Style Guide* and the segment's GUI implementation.

RTE Compliance Levels (3 of 3)

DMSO

Level 7: Interoperable Compliance Level. Segments reuse COE component segments to ensure interoperability. These include COE provided comms interfaces, message parsers, database tables, track data elements, and logistics services. All access is through published APIs with documented use of few, if any, private APIs. Segments do not duplicate any functionality contained in COE component segments.

Level 8: Full COE Compliance Level. Proposed new functionality is completely integrated into the system (e.g., makes maximum possible use of COE services) and is available via the Executive Manager. The segment is fully compliant with the Style Guide and uses only published public APIs. The segment does not duplicate any functionality contained elsewhere in the system whether as part of the COE or as part of another mission application segment.

MRCI General and Technical Requirements (7 of 13)

DMSO

20. To the extent practical, MRCI reconfigurable modules shall be reusable among instances of C4I-MRCI combinations.
21. MRCI shall support flow of both perceived and ground-truth data, information and C2 transactions consistent with applicable FOM and SOM definitions for Federations in which it participates.
22. MRCI design shall not be restricted by the use of legacy simulation-to-real world interface solutions.
23. MRCI design shall not be restricted by the use of alternate redundant mechanisms to the RTI.
24. MRCI shall be developed using a language for specification of formats, timing and conversion requirements of data, information and C2 interchange in clear, consistent and concise interface specifications of internal and external interfaces.

MRCI General and Technical Requirements (8 of 13)

DMSO

25. MRCI shall use well-defined application program interface between layers and the support services.
26. MRCI shall optimize the interdependencies between software components so that the impact of change is localized.
27. MRCI shall reduce the number of, and special training required for, system administrators, network administrators, and other exercise support personnel.
28. MRCI shall minimize life-cycle costs and be logistically supportable.
29. MRCI shall be flexible, extensible, and modifiable to capitalize on current and emerging industry accepted standards and commercially available products to the maximum extent possible to support the system requirements and to streamline upgrades.

MRCI General and Technical Requirements (9 of 13)

DMSO

30. MRCI shall provide sufficient flexibility, modifiability and performance to support changes and extensions to the interfaces on both the C4I and RTI sides.
31. MRCI shall execute in a distributed manner across heterogeneous platforms including current warfighting systems.
32. MRCI software shall be portable to different vendor host platforms with minimal or no modifications.
33. MRCI shall provide an experimental capability to interface AWSIM/R to TBMCS IAW the TBMCS SOM.

33.1 MRCI shall provide the capability of the current PRW and CWIC interfaces.

33.2 MRCI shall provide the capability to interface existing simulations with current and rapidly-prototyped C4I systems.

MRCI General and Technical Requirements (10 of 13)

DMSO

34. MRCI shall provide an experimental capability to interface NASM/AP to TBMCS.

34.1 MRCI shall provide the capability to be used with next generation simulations and the Prototype Federation products.

35. MRCI shall provide an experimental capability to interface AFSAF to TBMCS.

35.1 MRCI shall support the parsing and transmission of ATO/ACO for virtual mission planning and execution within AFSAF.

35.2 MRCI shall support operations in Federations where STOW SEID SI and OpenSAF are used IAW the appropriate FOM.

36. The design of the MRCI shall not preclude the addition of a module to support direct C4I system database access (vice message interchange) when specified in future C4I SOMs.

MRCI General and Technical Requirements (11 of 13)

DMSO

37. MRCI must support segregation, labeling and simultaneous existence of live and simulation data within all of its modules and in all of its outputs on both C4I and RTI sides.
38. MRCI must support the populating of messages with relatively unstructured text content to the C4I system and within the CCSIL-like message converter, while correctly maintaining the intent of such messages.
39. MRCI must support interpreting messages with relatively unstructured text content from the C4I system and within the CCSIL-like message converter, while correctly maintaining the intent of such messages.

MRCI General and Technical Requirements (12 of 13)

DMSO

40. The Federation Design in which the MRCI participates must accommodate scaling, normalizing or otherwise harmonizing data and information transactions where “detail mismatches” would result in unrealistic representations of the battlespace to the C4I system.
41. MRCI must provide functionality compatible with the STOW SSF and data collection facilities in support of STOW FOMs.
42. MRCI must maintain content integrity and conformity in all internal data-to-data/ information-to-information/ C2-to-C2 transformations.
43. MRCI must not introduce spatial or temporal inconsistencies into the C4I system’s “world view”.

MRCI General and Technical Requirements (13 of 13)

DMSO

43.1 Via the MRCI, simulated entities must be able to affect the live C4I systems and vice versa. Simulated entities must also be able to control communications between live C4I systems; data, information, and C2 flow between live and simulated world shall be influenced in quantity and quality based on environment, geometric, physics and other connectivity determinants computed elsewhere in the Federation.

NRaD

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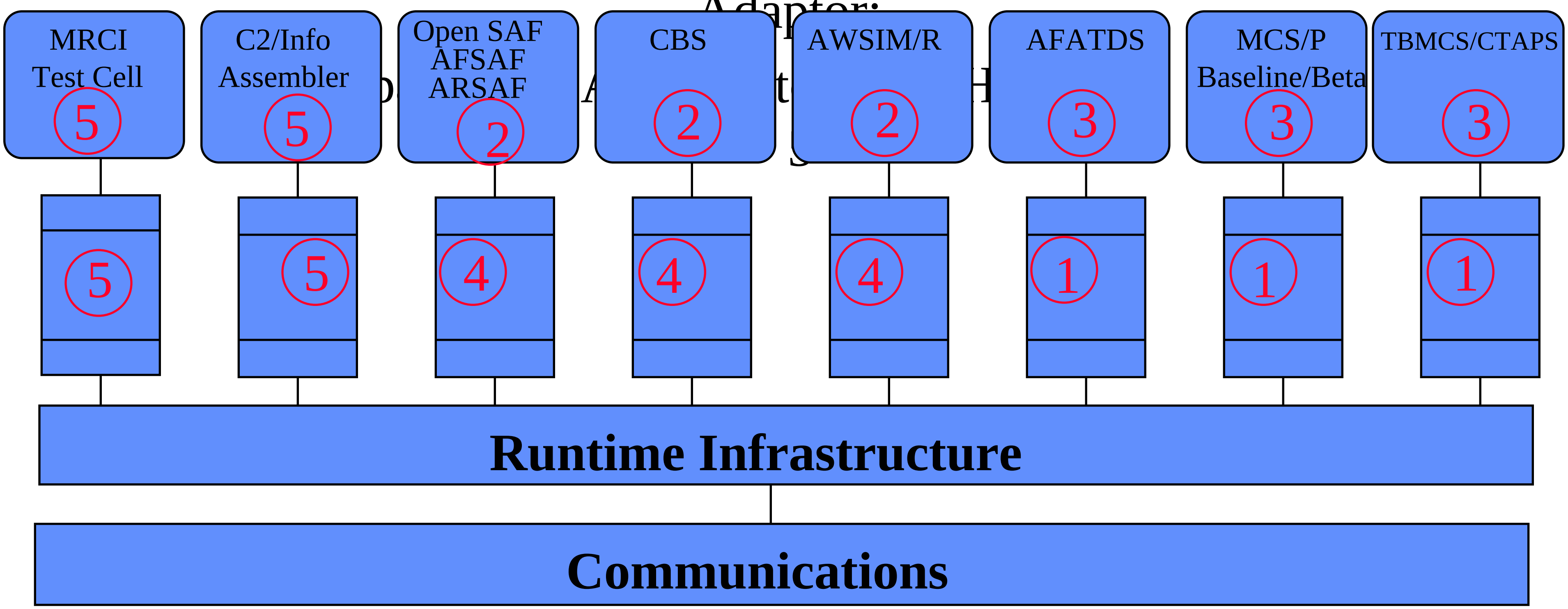
Special Technical Emphasis Discussion

DMSO

Topic: Functional Residency of C4I Message Fabrication Process

Alternatives: 1 Part of MRCI; 2 Part of Simulation(s);

3 Part of C4I System; 4 Part of Simulation Adapter;



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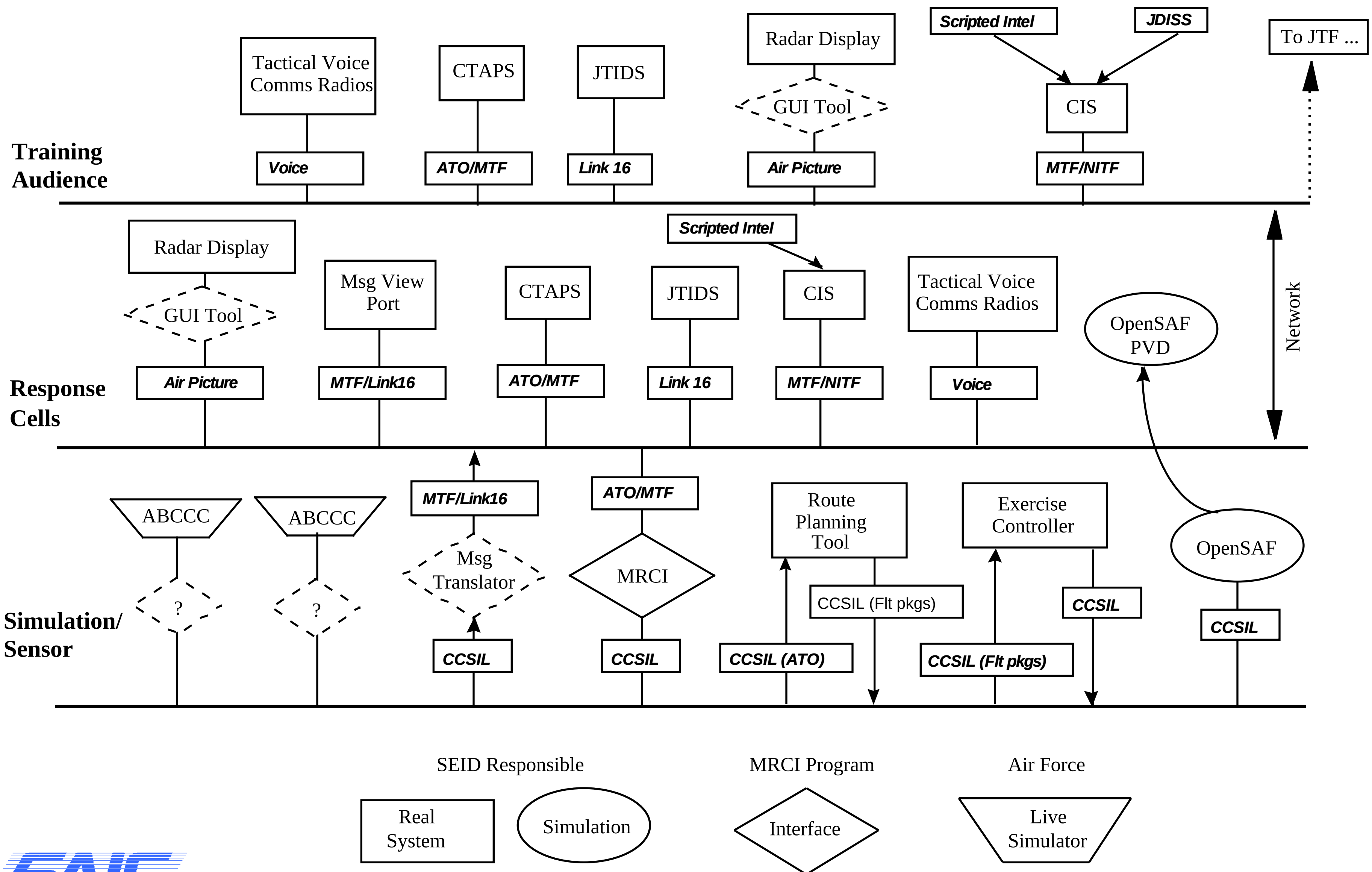
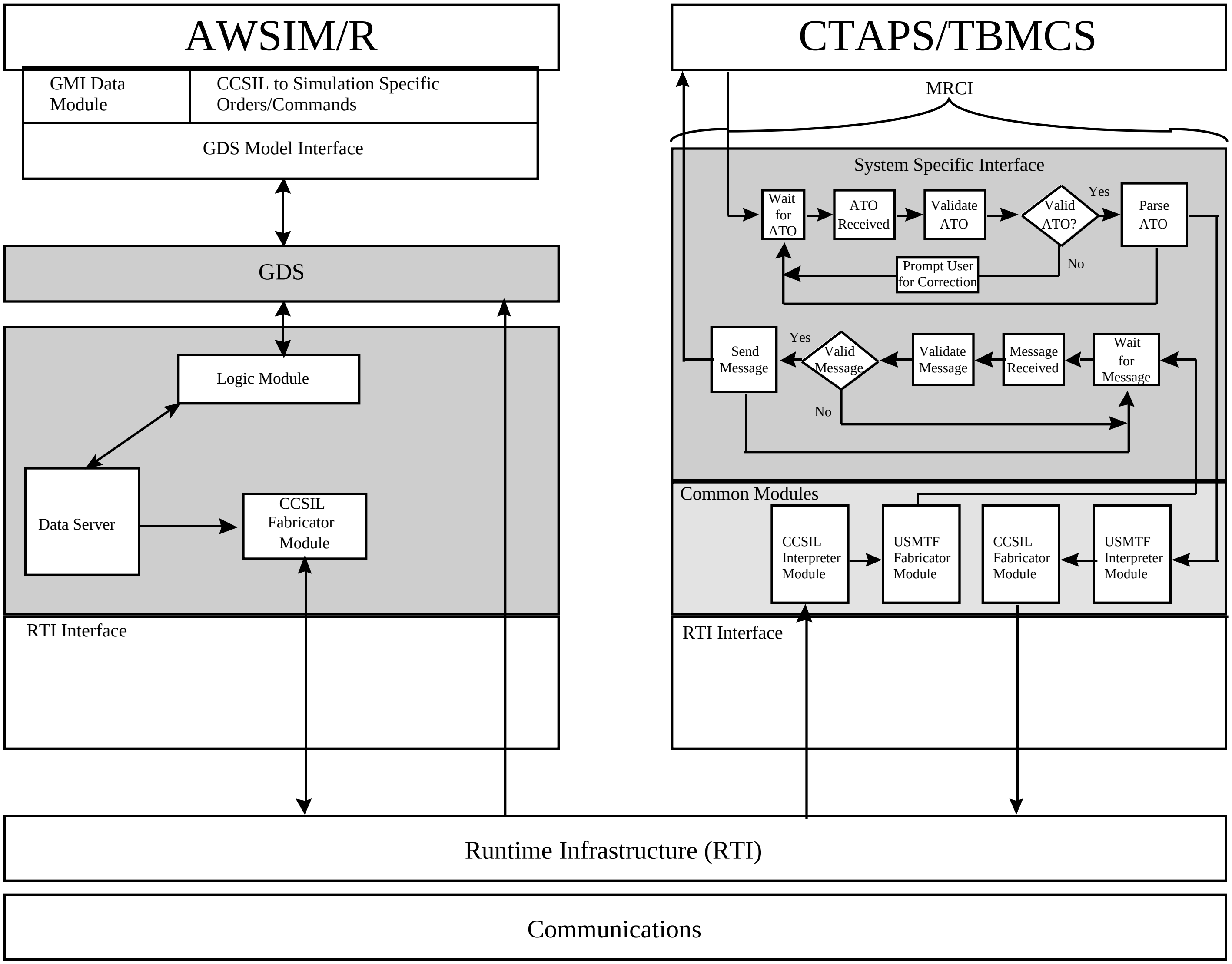
STOW Context of Air Force Interfaces

DMSO



Experiment #1 CTAPS/ TBMCS - AWSIM/R

DMSO



Experiment #2 CTAPS/TBMCS-AFSAF

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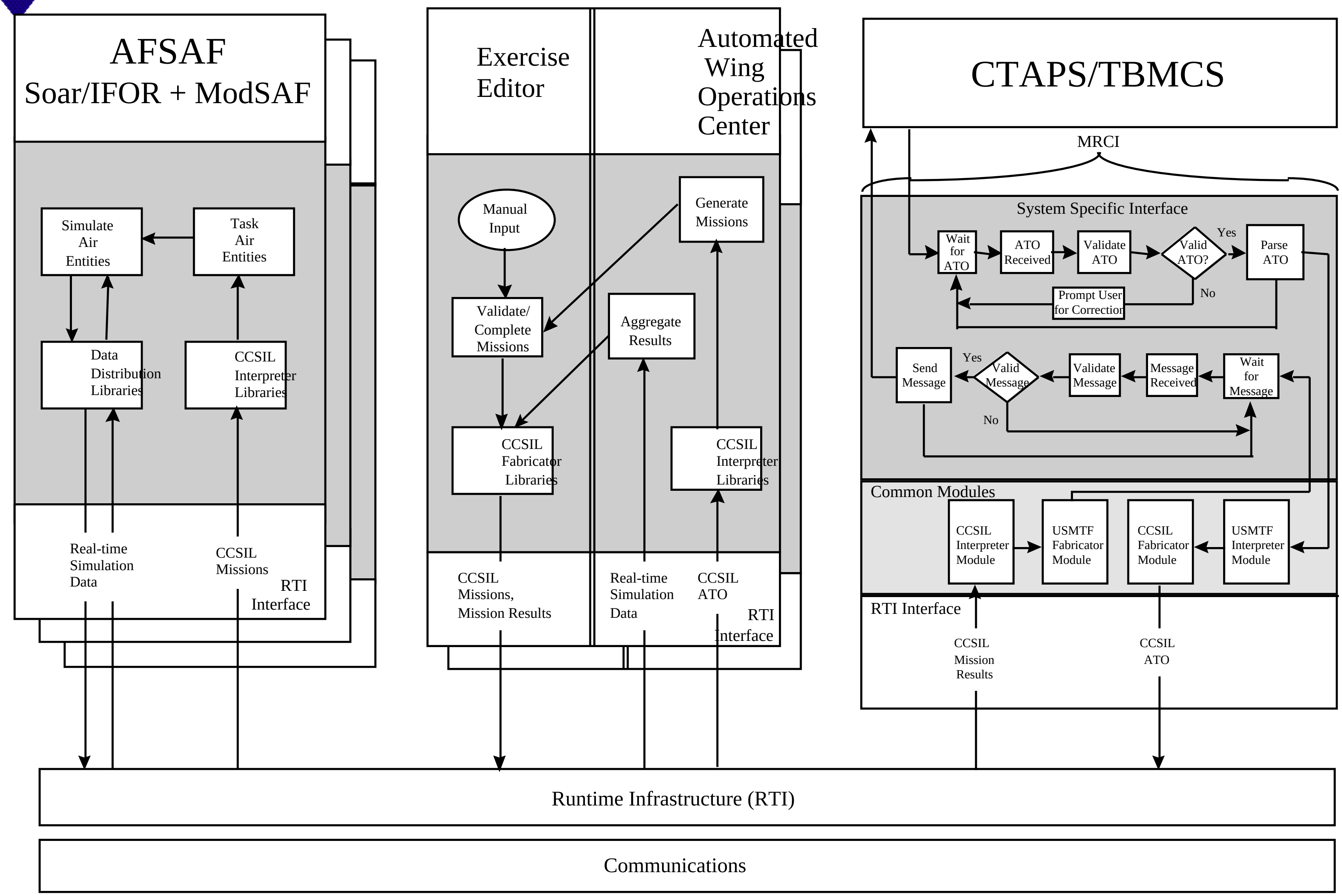
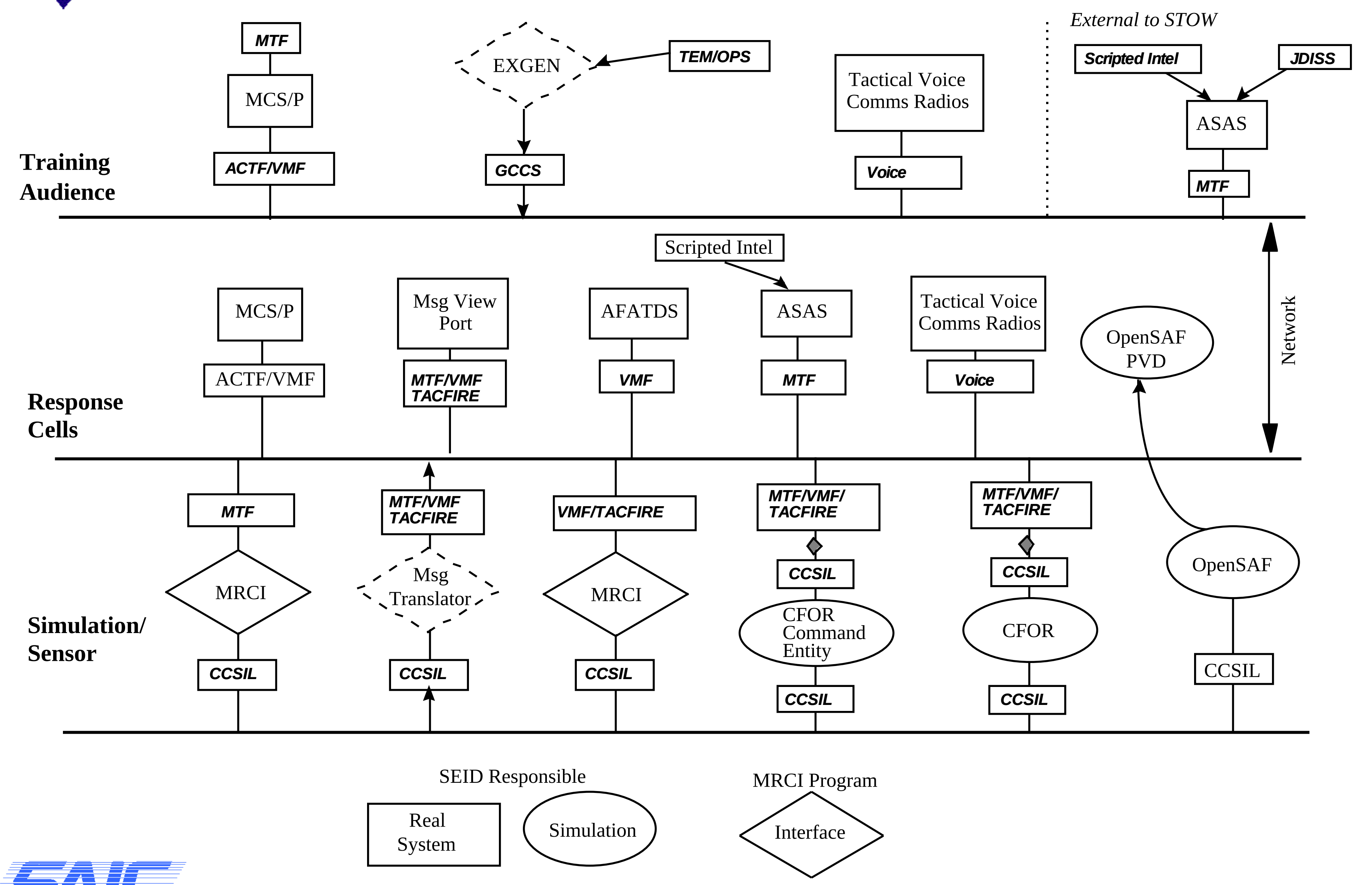


STOW Context of Army Interfaces

DMSO



Experiment #3 MCS-AFATDS-CBS

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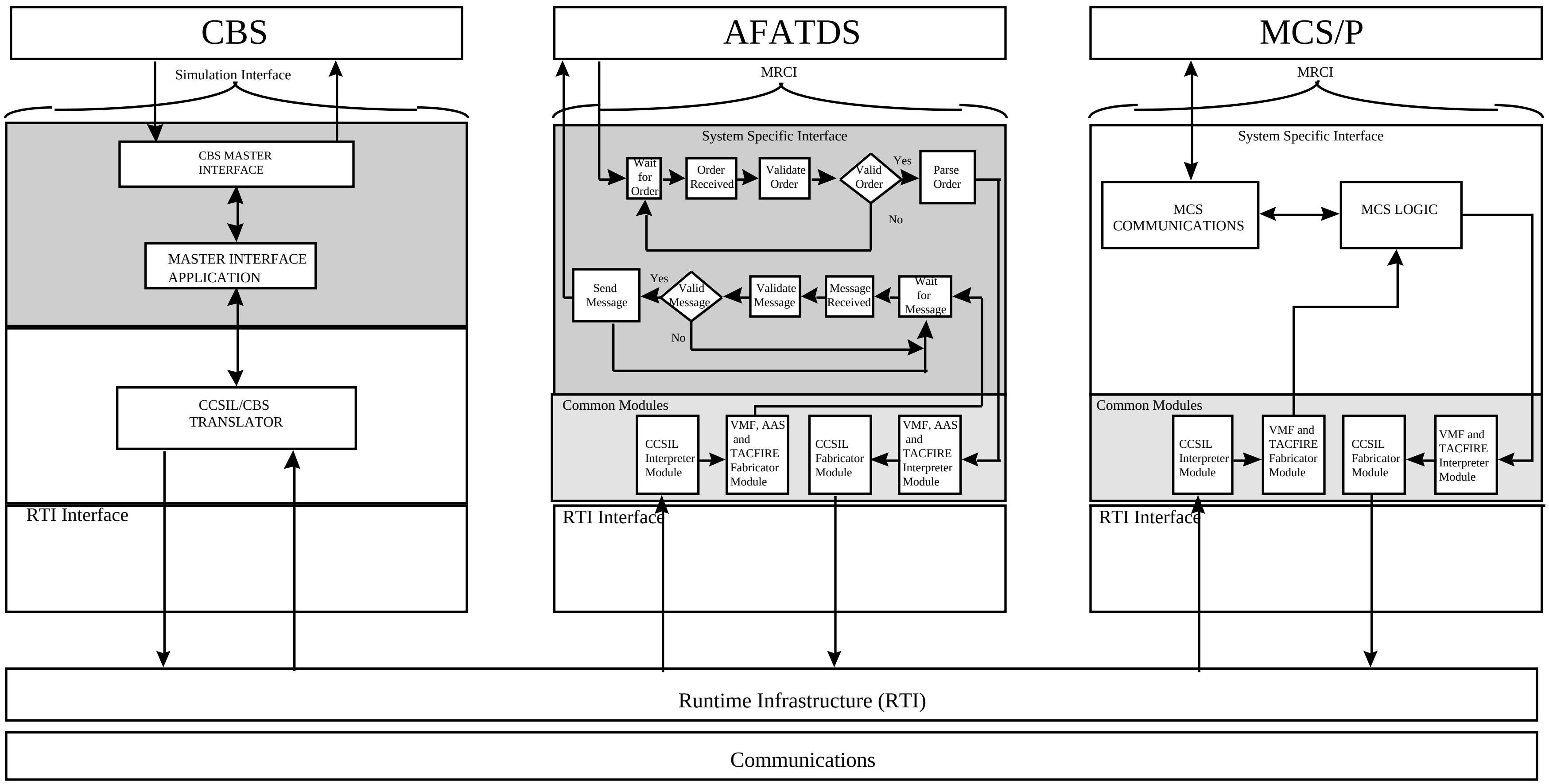

Experiment #4 MCS-AFATDS-ARSAF

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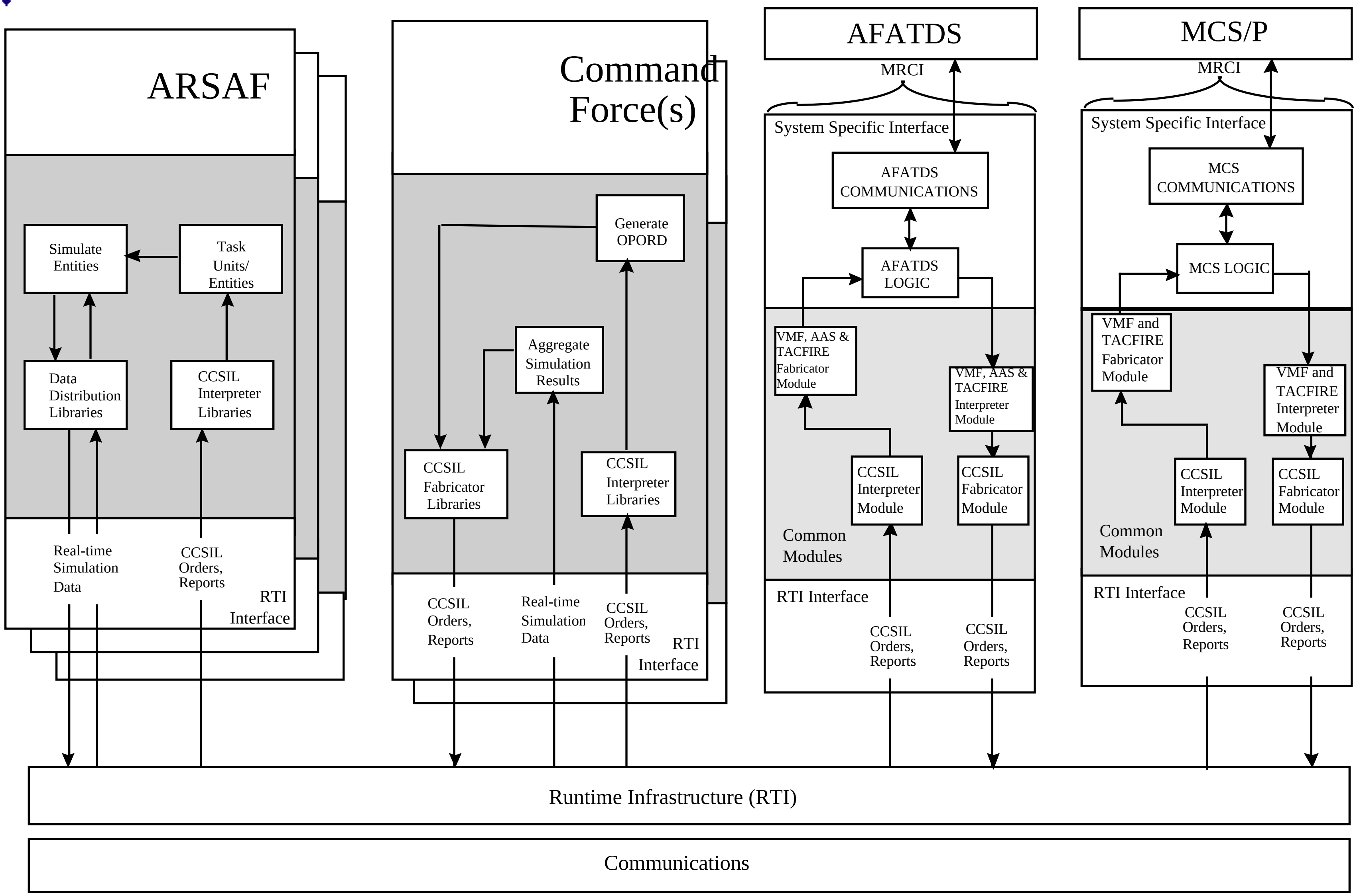

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CTAPS v(5.2) Messages For MRCI Experiment

DMSO

* MISREP (4 types) - Mission Report, reports mission and items of intel interest.

* INTREP/C3I (3 types) - Intelligence Report, provides joint exchange of information.

* INTREP/KILLSUM (3 types) - Intelligence Report, provides enemy kill summary.

* IPIR - Initial Phase Interpretation Report, reports imagery intelligence.

* ABSTAT - Air Base Status Report, reports air base capability to support operations.

* RECCEXREP - Reconnaissance Exploitation Report, provides abbreviated imagery interpretation report format.

* TACREP (A,B,C) - Tactical Reports, provide perishable information for immediate attention of the tactical commander. (Mission takeoff, landing, and aircraft status)

* TACELINT - Tactical ELINT Report, reports time-critical ELINT information.

* OPREP - Operation Report, provides the JFC immediate notice of incidents.

* ATOCONF - Air Tasking Order/Confirmation, inform requesting command and tasking authority of action taken.

Task Force XXI FATDS Message Table (1 of 7)

DMSO

Legend for Message Table Slides
Bold = Command and Control Transactions
____ = AFATDS Operational Messages

(J)VMF K#	TFXXI K#	Message Name	Applique	AFATDS	BCS Cannon	Paladin	FO-CC	Firefinder
02.1	96.72	**Check Fire**	X	X	X	X	X	X
02.2		Registration Data			X	X		
02.3		Meteorological Data		X	X	X		X
02.4	96.66	**Call For Fire**	X	X	X	X	X	X
02.5	96.28	Shell Report	X	X	X		X	
02.6	96.73	**Observer Notification**	X	X	X	X	X	X
02.7		Survey Control Point		X			X	
02.8		**Schedule of Fires**		X	X		X	
02.9		Target Data		X	X		X	X
02.10		**Planned Mission Cancel Request**						
02.11		Ammunition History		X	X	X		
02.12		**On-Call Fire Request**		X	X	X	X	X
02.13		Mission Clearance						X
02.14	96.69	**Message To Observer**	X	X	X	X	X	
02.15	96.74	FS Coordination Measures	X	X	X	X	X	

Task Force XXI FATDS Message Table (2 of 7)

DMSO

Legend for Message Table Slides
Bold = Command and Control Transactions
____ = AFATDS Operational Messages

(J)VMF K#	TFXXI K#	Message Name	Applique	AFATDS	BCS Cannon	Paladin	FO-CC	Firefinder
02.16	96.67	**End of Mission and Surveillance**	X	X	X	X	X	
02.17		Mission Summary-Indirect Fire/CAS						
02.18		Fire Unit Capabilities		X	X	X		
02.19		**ATI Query, Request for Tgt Info**						
02.20		Survey Control Point Info Request		X			X	
02.21		**Request for Clearance to Fire**						
02.22	96.75	**Subsequent Adjust**	X	X	X	X	X	X
02.23		**Execute Fire Plan**						
02.24		**In Progress Mission Notification**						
02.25		EOM Notification						
02.26	96.42	Free Text	X	X	X	X	X	X
02.27		**Tactical Air Request (TAR)**	X	X				
02.31		**Mission Request Rejection**	X	X				
02.32		**TAR Acceptance**	X	X				
02.33		**TAR Aircrew Brief**	X	X				

Task Force XXI FATDS Message Table (3 of 7)

DMSO

Legend for Message Table Slides
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(J)VMF K#	TFXXI K#	Message Name	Applique	AFATDS	BCS Cannon	Paladin	FO-CC	Firefinder
02.34		Aircraft On-Station	X	X				
02.35		Aircraft Departed IP	X	X				
02.36		Aircraft Mission Update	X	X				
02.40		**Rocket/Missile Launcher Order**						
02.41		Geographic Reference Data		X	X	X		
02.42		**Cdr's Fire Unit Guidance**		X				
02.43		**Cdr's Fire Mission Guidance**		X				
02.44		Cdr's Target Acquisition Guidance		X				X
02.45		**Howitzer Fire Orders**			X	X		
02.46		**Reply/Remarks**			X			
02.47		**Rocket/Msle Ops Status Update**		X				
02.48		**Fire Plan Assignment Data**						
02.49		Rkt/Msle Munitions Effects Data		X				
02.50	96.70	Observer Status	X	X	X	X	X	X
02.51		Unit Situation Report		X			X	

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Task Force XXI FATDS Message Table (4 of 7)

DMSO

Legend for Message Table Slides
Bold = Command and Control Transactions
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(J)VMF K#	TFXXI K#	Message Name	Applique	AFATDS	BCS Cannon	Paladin	FO-CC	Firefinder
02.52	96.40	**Request For Information**	X	X	X	X		
02.53		Target Element Data Entry						
02.54		**Deployment Command**			X	X		
02.55		**MOI Data Exchange**			X	X		
02.56		**Fire Unit Tactical Scheduling**						
02.57	96.07	**Operations order**	X	X				
02.58		Survey Point Location Diagram						
02.59	96.27	STRIKEWARN [NUC]	X	X				
02.60	96.51	Basic Wind Report [BWR]	?	?				
02.61	96.52	Chemical Downwind Reprt [CDR]	?	?				
02.62	96.53	Effective Downwind Report [EDR]	X	X				
02.63	96.54	NBC1	X	X				
02.64	96.55	NBC2	X	X				
02.65	96.56	NBC3	X	X				
02.66	96.57	NBC4	X	X				

Task Force XXI FATDS Message Table (5 of 7)

DMSO

Legend for Message Table Slides
Bold = Command and Control Transactions
____ = AFATDS Operational Messages

(J)VMF K#	TFXXI K#	Message Name	Applique	AFATDS	BCS Cannon	Paladin	FO-CC	Firefinder
02.67	96.58	NBC5	X	X				
02.68	96.59	NBC6	?	?				
	96.01	Logistics Report	X	X				
	96.02	Personnel Status Report	X	X				
	96.03	Cache Report	?	?				
	96.04	EPW/Detainee Report	X	X				
	unk	EPW/Detainee Hand Off	?	?				
	unk	Aviation Support	?	?				
	unk	Vehicle Status Report	?	?				
	unk	Ammunition Status Report	?	?				
	unk	Fuel Status report	?	?				
	unk	Class I and Water	?	?				
	unk	Class III (Package)	?	?				
	unk	Class III (Bulk)	?	?				
	unk	Class V	?	?				

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Task Force XXI FATDS Message Table (6 of 7)

DMSO

Legend for Message Table Slides
Bold = Command and Control Transactions
____ = AFATDS Operational Messages

(J)VMF K#	TFXXI K#	Message Name	Applique	AFATDS	BCS Cannon	Paladin	FO-CC	Firefinder
	unk	Maintenance Support	?	?				
	unk	Medical Information	?	?				
	unk	Personnel daily Summary	?	?				
	unk	Personnel Battle Loss Report	?	?				
	96.09	FRAME GRABBER	X	X				
05.N06	96.10	CCIR	X	X				
	96.11	Intel Overlay	?	?				
	96.12	Doctrinal Template	?	?				
	96.13	Fire Control Radar Target	?	?				
	96.25	Ops (7 Variations of SITREPs)	X	X				
	96.35	Minefield Laying	?	?				
	96.36	Overlays [6 Variations]	X	X				
	96.37	Will Comply [WILCO]	?	?				
	96.38	Bridge Reports	?	?				
04.N12	96.39	Route Reports	?	?				

Task Force XXI FATDS Message Table (7 of 7)

DMSO

Legend for Message Table Slides
Bold = Command and Control Transactions
____ = AFATDS Operational Messages

(J)VMF K#	TFXXI K#	Message Name	Applique	AFATDS	BCS Cannon	Paladin	FO-CC	Firefinder
05.N07	96.41	REDCON/MOPP Status	X	X				
07.1	96.43	MEDEVAC Request	X	X				
	96.44	Obstacles	?	?				
	96.45	Air Alert	X	X				
	96.46	Warning/FRAG Order	X	X				
	96.47	Fire Plan Overlay	X	X				
	96.49	Position Report	X	X				
		Totals	39	54	23	19	16	11

Legend: (J) VMF K# - Both Joint and Fire Support (FS) Variable Message Formats (VMF)
TF XXI K# - Task ForceXXI Variable Message Formats
X = More than one source indicates that the system is to implement the message
? = Conflicting information exists as to whether a system is to implement the message
unk = Message is from Applique S/SDD, but a corresponding K# could not be found

Note: The AFATDS column has been inferred from requirement to incorporate Applique and interoperate with other fire support systems

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (1 of 40)

DMSO

Legend for Message Cross Reference Matrix
Bold = Command and Control Transactions
Italics= Information Transactions
_____= AFATDS Operational Messages

Msg	Contains
K01.50 FREE TEXT	
8	*SYS PTM - System Plain Text Message*
13	*Free Text Message*
21	*System Plain Text Message*
24	*Free Text Message (FT)*
37	*Free Text Message*
K02.1 CHECK FIRE	
11	**COMD CC - Command Cancel Check Fire**
12	**COMD CF - Command Check Firing Message**
3012/	**FM FOCMD - Fire Mission Forward Observer Command Message**

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (2 of 40)

DMSO

Msg	Contains
3013	**FM CHECK - Fire Mission Command to Check Message**
3016	**FM CHECK - Fire Mission Command to Check Message**
3019/	**FM FOCMD - Fire Mission Forward Observer Command Message**
3031/	**FOCMD - Forward Observer Command Message**
3040/	**FM FOCMD - Fire Mission Forward Observer Command Message**
3048/	**Forward Observer Command Message**
3063	*Checkfire Message (CHKF)*
3069/	*AIR UPD - Airborne Mission Target Position Update*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (3 of 40)

DMSO

Msg	Contains
3071/	**FM COMD - Fire Mission Commands Message**

KO2.2 REGISTRATION DATA

1013	*AFU REG - Ammunition Fire Unit Fire Unit Registration Message*
1017	*AFU REG - Ammunition Fire Unit Registration Data Message*
1030	*Registration Data Input Message*

K02.3 METEOROLOGICAL DATA

4000	*MET CM - Computer Meteorological Data Message*
4001	*MET CM - Computer Meteorological Data Message*
4002	*MET TA - Meteorological Target Acquisition Data Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (4 of 40)

DMSO

Msg	Contains
4003	*MET TALL - Meteorological Target Area LOW Level Message*
4004	*MET TA - Meteorological Target Acquisition Message*
4005	*MET CFL - Computer Meteorological Fallout Input Message*
4006	*MET CW - Meteorological Forecast Message*
4007	*Computer Meteorological Data Message*
4009	*Meteorological Message (MET)*
4010	*MET CM1 - Computer Meteorological Message Part 1*
4011	*MET CM2 - Computer Meteorological Message Part 2*
9025	*MET FPTLL - Firing Point Low-Level Meteorological Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (5 of 40)

DMSO

Msg	Contains
9040	*MET SUPRP - MDS Surface Observation Message*

K02.4 CALL FOR FIRE

3021	**FM QF - Fire Mission Quick Response Fire Request Message**
3024	**FR MOV1 - Fire Request Moving Target (1) Message**
3025	**FR MOV2 - Fire Request Moving Target (2) Message**
3027	**FR QUICK - Quick Response Fire Request Message**
3032	**FR LASER - Fire Request Using Laser Message**
3033	**FR SHIFT - Fire Request Using Shift from a Known Point Message**
3034	**FR GRID - Fire Request Using Grid Coordinates Message**

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (6 of 40)

DMSO

Msg	Contains
3036	**FR POLAR - Fire Request Using Polar Coordinates Message**
3041	**FM CFF - Fire Mission Call for Fire Message**
3053	*FM THMTGT - Fire Mission Terminal Homing Munition and/or Moving Target Message*
3054	**FM CFF - Fire Mission Call for Fire Message**
3056	**FM CFF - Fire Misison Call for Fire Message**
3057	*FM THMTGT - Fire Mission Terminal Homing Munition and/or Moving Target Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (7 of 40)

DMSO

K02.5 SHELL, BOMB, MORTAR REPORT

2009 *SHELREP - Artillery Target Intelligence Shelling Report*

2011 *ATI SHR - Artillery Target Intelligence Shell Report Message*

K02.6 OBSERVER NOTIFICATION

3012/ **<u>FM FOCMD - Fire Mission Forward Observer Command Message</u>**

3019/ **<u>FM FOCMD - Fire Mission Forward Observer Command Message</u>**

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (8 of 40)

DMSO

Msg	Contains
3031/	**FOCMD - Forward Observer Command Message**
3040/	**FM FOCMD - Fire Mission Forward Observer Command Message**
3048/	**Forward Observer Command Message**
3052/	*Radar Ready/Registration Report*

K02.7 SURVEY CONTROL POINT

6008	*SPRT SCPST - Survey Control Point Storage*
6501	*SURV LIST - Survey List Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (9 of 40)

DMSO

<u>Msg</u>	<u>Contains</u>
6509	*SURV PNT - Survey Point Message*
K02.8 SCHEDULE OF FIRES	
5000	*NNFP FASCAM - NNFP Family of Scatterable Mines Minefield Input Message*
5001	*FIREPLAN*
5003/	*NNFP TARGET - Target Message*
5005	**<u>NNFP FPTU - Fire Planning Target Update Input Message</u>**

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (10 of 40)

DMSO

Msg	Contains
5006	*NNFP XTGT - Non-Nuclear Fire Plan Target Data*
5007	*NNFP XSCD - Target Data Transmission Message*
5018	**NNFP CFF - Nonnuclear Fire Planning Call for Fire Message**
5020	*PLAN DESC - Fire Plan Description Message*
5021	*PLAN SCHD - Fire Plan Schedule Message*
5022	*TGT ORDR - Target Order Message*
5030	**NNFP INST - Nonnuclear Fire Planning Target Instructions Message**

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (11 of 40)

DMSO

Msg	Contains
5032	**NNFP RESFU - Nonnuclear Fire Planning Reserve Unit/Interval Message**
____	**NNFP COMFP - Nonnuclear Fire Planning Compute Fire Plan**

K02.9 TARGET DATA

2000	*ATI AZR - Artillery Target Intelligence Azimuth Report*
2001	*ATI AZR - Artillery Target Intelligence Azimuth Distance Report Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (12 of 40)

DMSO

Msg	Contains
2002	*ATI CDR - Artillery Target Intelligence Coordinate Report Message*
2003	*ATI TGR - Artillery Target Report Input Message*
2005	*ATI CDR - Artillery Target Intelligence Coordinate Report Message*
2006	*ATI CDR- Artillery Target Intelligence Coordinate Report*
2007	*ATO GRID - Artillery Target Intelligence Report Using Grid Coordinates*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (13 of 40)

DMSO

Msg	Contains
2008	*ATI POLAR - Artillery Target Intelligence Report Using Polar Coordinates*
2011/	*ATI SHR - Artillery Target Intelligence Shell Report Message*
2012	*ATI MFR - Artillery Target Intelligence Mission Fired Report*
2018	*ATI TTR - Artillery Target Intelligence Terminal Homing Munitions Target Report*
2020	*ATI TGT - Artillery Target Intelligence Target Report*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (14 of 40)

DMSO

Msg	Contains
K02.10 FIRE PLAN MISSION/FIRE PLAN CANCELLATION	
3018/	**FM EOM - Fire Mission End of Mission**
5003/	*NNFP TARGET - Target Message*
5025/	**NNFP COMD - Nonnuclear Fire Planning Command Message**
K02.11 AMMUNITION INVENTORY	
1023/	*AFU AMSS - Ammunition and Fire Unit Ammunition Storage Site Message*
1029	*Ammunition Status Message*
1032	*AFU AMMO - Fire Unit Ammunition Status Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (15 of 40)

DMSO

Msg	Contains
K02.12 ON-CALL FIRE COMMAND	
3023	**FM FIRE - Fire Mission Command to Fire Message**
3019/	**FM FOCMD - Fire Mission Forward Observer Command Message**
3031/	**FOCMD - Forward Observer Command Message**
3040/	**FM FOCMD 0 Fire Mission Forward Observer Command Message**
3048/	**Forward Observer Command Message**
K02.13 MISSION CLEARANCE	
NONE (NOT IMPLEMENTED)	

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (16 of 40)

DMSO

Msg	Contains
K02.14 MESSAGE TO OBSERVER	
3014	**FM MTO - Fire Mission Message to Observer Message**
3037	*MTO - Message to Observer Message*
3043	*FRND BA - Friendly Fire - Battery*
3044	*FRND TGT - Friendly Fire Target*
3046	*Message to Observer Message*
3055	*FM MTO Message to Observer Message*
3064/	*HB/MPI - Height of Burst and Mean Point of Impact Registration Message*
3065/	*RDR REG - Radar Registration Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (17 of 40)

DMSO

Msg	Contains
K02.15 COORDINATION MEASURES	
6004	*SPRT ZNE - Zone of Responsibility Message*
6005	*SPRT BEOM - Support Battlefield Geometry*
6019	*SPRT ZNE - Support Zone of Responsibility*
6022	*FL TRACE - Front LineTrace Message*
6024	*SPRT GEO1 - Support Battlefield Geometry 1 Message*
6025	*SPRT GEO2 - Support Battlefield Geometry 2 Message*
6028	*SPRT PNT - Support Point Message*
9065	*SPRT ACA - Support Airspace Coordination Area Message*
9070/	*SPRT DISP - Support Display Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (18 of 40)

DMSO

Msg	Contains
K02.16 END OF MISSION AND SURVEILLANCE	
1033	**AFU MFR - Fire Unit Nonnuclear Mission Fired Report Message**
3003/	**FM SUBS - Fire Mission Subsequent Commands Message**
3018/	**FM EOM - Fire Mission End of Mission**
3026	**EOM & SURV - End of Mission and Surveillance Message**
3028/	*SA COORD - Subsequent Adjustment Coordinates Message*
3029/	*SA LASER - Subsequent Adjustment Using Laser Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (19 of 40)

DMSO

<u>Msg</u>	<u>Contains</u>
3035/	*PREC REG - Precision Registration*
3038/	*SUBQ ADJ - Subsequent Adjust Message*
3050	**End of Mission Command Message**

K02.17 MISSION SUMMARY - INDIRECT FIRE/CAs MISSION

NONE (NOT IMPLEMENTED)

K02.18 FIRE UNIT CAPABILITIES

1024	*AFU UPDATE - Fire Unit Update Message*
1027	*Howitzer Status Update Message*
1028	*Fire Unit Mask Data Message*
1031	*Muzzle Velocity Message*
1043/	*AFU FUST - Fire Unit Status Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (20 of 40)

DMSO

Msg	Contains
K02.19 ARTILLERY INTELLIGENCE QUERY/STANDING REQUEST FOR TARGET INFORMATION	
2013	**ATI PREFP - Artillery Target Intelligence Prepares a Fire Plan**
2014	**ATI SRI - Artillery Target Intelligence Standing Request for Info Input Message**
2015	**ATI QUERY - Artillery Target Intelligence Query Message**
2021/	**ATI CMD - Artillery Target Intelligence Command Message**
2026	**ATI SRCH - Artillery Target Intelligence Search Message**

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (21 of 40)

Msg	Contains
K02.20 SURVEY CONTROL POINT INFORMATION REQUEST	
6010	*SPRT TPAC - Survey Control Point Access*
6502	*SURV SRCH - Survey Search Message*
K02.21 REQUEST FOR CLEARANCE TO FIRE	
	NONE (NOT IMPLEMENTED)
K02.22 SUBSEQUENT ADJUST	
3003/	**FM SUBS - Fire Mission Subsequent Command Message**
3028	**SA COORD - Subsequent Adjustment Coordinates Message**
3029	**SA LASER - Subsequent Adjustment Using Laser Message**

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (22 of 40)

DMSO

Msg	Contains
3035	*PREC REG - Precision Registration*
3038	*SUBQ ADJ - Subsequent Adjust Message*
3052/	*Radar Ready/Registration Report*
3064/	*HB/MPI - Height of Burst and Mean Point of Impact Registration Message*
3065/	*RDR REG - Radar Registration Message*

K02.23 EXECUTIVE FIRE PLAN

5019	**NNFP EXECFP - Execute Fire Plan Message**
5026	**NNFP COMFP - Nonnuclear Fire Planning Compute Fire Plan Message**

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (23 of 40)

DMSO

Msg	Contains
K02.24 MISSION NOTIFICATION	
9130	*Target Air Hazard Message*
9140	*Platoon Air Hazard Message*
K02.5 END OF MISSION NOTIFICATION	
	NONE (NOT IMPLEMENTED)
	AIR FORCE ICP
K02.27 TACTICAL AIR REQUEST	
K02.28 (ALLOCATED)	
K02.29 (ALLOCATED)	
K02.30 (ALLOCATED)	

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (24 of 40)

DMSO

Msg Contains

AIR FORCE ICP

K02.31 MISSION REQUEST REJECTION

K02.32 TACTICAL AIR REQUEST ACCEPTANCE

K02.33 TACTICAL AIR REQUEST AIR CREW BRIEFING

K02.34 AIRCRAFT ON-STATION MESSAGE

K02.35 AIRCRAFT DEPART INITIAL POINT MESSAGE

K02.36 AIRCRAFT MISSION UPDATE MESSAGE

K02.37 (ALLOCATED)

K02.38 (ALLOCATED)

K02.39 (ALLOCATED)

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (25 of 40)

DMSO

Msg	Contains
K02.40 ROCKET/MISSILE LAUNCHER ORDERS	
1039	**Command (COM)**
3061	**Call for Fire Message (CFF)**
K02.41 GEOGRAPHICAL REFERENCE DATA	
6000	*SPRT MAP - Map Modification*
6021	*Map Modification Input Message*
K02.42 COMMANDERS FIRE UNIT GUIDANCE	
1004	**AFU POSTUR - Ammunition Fire Unit Posture Message**
1007	*AFU AMOL - Ammunition Fire Unit Critical Ammunition Level Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (26 of 40)

DMSO

Msg	Contains
1008	*AFU ASR - Ammunition Fire Unit Available Supply Rate Message*
1019	*AFU POSTUR - Fire Unit Posture Message*

K02.43 COMMANDERS FIRE MISSION GUIDANCE

3005	*FM FDSMOD - Fire Mission Direction System Modification Message*
3006	*FM SELECRI - Fire Mission Selection Criteria Input Message*
3007	**FM ATTACK - Fire Mission Commander’s Attack Method Input Message**
3008	*FM SHLCRI - Fire Mission Shell Criteria Input Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (27 of 40)

DMSO

Msg	Contains
3009	*FM MOD - Fire Mission Commander's Criteria Modifications Input Message*
3010	**FM FUSEL - Fire Mission Commander's Fire Unit Selection Criteria Input Message**
3073	**FM XCLUDE - Fire Mission Commander's Fire Unit Exclusion Message**
5017	**NNFP MOD - Commander's Criteria Modifications Input Message**
5029	**NNFP FUSEL - Nonnuclear Fire Planning Fire Unit Selection Criteria Message**

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (28 of 40)

DMSO

Msg	Contains
5031	**NNFP ATTACK - Nonnuclear Fire Planning Attack Message**
5033	**NNFP XCLUDE - Nonnuclear Fire Planning Fire Unit Exclusion Message**
9010	**FM CMDMOD - Commander's Criteria Modification**

K02.44 COMMANDER'S TARGET ACQUISITION GUIDANCE

2019	*ATI TCRIT - Artillery Target Intelligence Targeting Criteria Message*
6002	*SPRT FILTER - Format Amplified Priority/Censor Zone*
6003	*SPRT FILTER - Support Filter Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (29 of 40)

DMSO

Msg	Contains
6007	*SPRT SEARCH - Support Search Message*
9005	*ATI CTTCRT - Commander's Tactical Terminal*

K02.45 HOWITZER FIRE ORDERS

3048/	**Forward Observer Command Message**
3049	**Fire Mission Message**
3051	**Firing Commands Message**
3047	**Observer Message**

K02.46 REPLY/REMARKS

9	*SYS DMDRLY - System Digital Message Device Relay Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (30 of 40)

DMSO

Msg	Contains
25/	*Response Message (RSP)*
27	*Fire Direction Data Manager (FDDM) to Weapon Message*
29	*FREETEXT Message*
2016	*ATI CBTI - Artillery Target Intelligence Combat Information Report*
2017	*ATI SVL - Artillery Target Intelligence Surveillance Report Message*
9020	*FM TGTSIG - Target Signature Data*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (31 of 40)

DMSO

Msg	Contains
9110	*SYS DPUMSN - DPU Mission Message*
3012/	**FM FOCMD - Fire Mission Forward Observer Command Message**

K02.47 ROCKET/MISSILE OPERATIONAL STATUS UPDATE

25/	*Response Message (RSP)*
1003/	**AFU OPSTAT - Ammunition Fire Unit Operational Status Message**
1021/	**AFU OPSTAT - Fire Unit Operational Status Message**
1038	*Data Base Update Message (DBU)*
1040	**Mission Fired Message (MF)**
1041	**Launcher Status Message (LST)**

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (32 of 40)

DMSO

Msg	Contains
1043/	**AFU FUST - Fire Unit Status Message**
3062	**Mission Status Message (MST)**

K02.48 FIRE PLAN ASSIGNMENT DATA

1015	**AFU BUILD - Ammunition Fire Unit Build A Plan Input Message**
5025/	**NNFP COMD - Nonnuclear Fire Planning Command Message**
6029	*SPRT BUILD - Support Build Message*

K02.49 ROCKET/MISSILE MUNITIONS EFFECTS DATA

6013	*SPRT AMODAT - Support Ammunition Data*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (33 of 40)

DMSO

Msg	Contains
6014	*SPRT RNGEFF - Support Range Dependent Delivery Errors/Effects Data*
6015	*SPRT EFFDAT - Support Effects Data*

K02.50 OBSERVER STATUS

3017	*FM OBCO - Fire Mission Observer Location Message*
3030	*OBSR LOC - Entry of Observer's Grid Coordinates Message*
3042	*FM OBCO - Fire Mission Observer Coordinate Message*

K02.51 UNIT SITUATION REPORT

1014	*AFU SR - Ammunition Fire Unit Situation Report Input Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (34 of 40)

DMSO

Msg	Contains
6026	*SPRT UNIT - Support Fire Unit Message*
6027	*SPRT EQMT - Support Equipment Message*
9070/	*SPRT DISP - Support Display Message*

K02.52 REQUEST FOR REPORT

22	*Request for Data Message*
1003/	**AFU OPSTAT - Ammunition Fire Unit Operational Status Message**
1023/	**AFU AMSS - Ammunition and Fire Unit Ammunition Storage Site Message**
1025	**AFU COMD - Ammunition Fire Unit Command Message**

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (35 of 40)

DMSO

Msg	Contains
1042	**Request Message (REQ)**
2021/	**ATI CMD - Artillery Target Intelligence Command Message**
3071/	**FM COMD - Fire Mission Commands Message**
4012	**MET COMD - Meteorological Command Message**
5025/	**NNFP COMD - Nonnuclear Fire Planning Command Message**
6020	**SPRT COMD - Support Command Message**
6023	*SPRT REQST - Status Request Message*
9030	*MET REQST - MET Request Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (36 of 40)

DMSO

Msg	Contains
K02.53 TARGET ELEMENT DATA ENTRY	
6016	*SPRT TEDE - Target Element Data Entry*
K02.54 DEPLOYMENT COMMAND	
1026	**Movement Orders Message**
9006	**Deployment Command Message**
K02.55 MUTUAL SUPPORT DATA EXCHANGE	
17	**SYS FSO - Fire Support Officer Message**
20	*SYS SBT - Subscriber Table Message*
9210	*SPRT MEM - Transfer Member Data*
23	*Subscriber File Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (37 of 40)

DMSO

Msg	Contains
K02.56 FIRE UNIT TACTICAL SCHEDULING	
9100	*SYS CONFIG - DFU Configuration Message*
9060	**SCD TASK - Fire Mission Schedule Task Information**
K02.57 OPERATIONS ORDER	
9075	**SPRT ORDERS - Support Orders Message**
K02.58 AIRBORNE FIRE MISSION	
3068	**AIR FIRE - Airborne Fire Request**
3069	**AIR UPD - Airborne Mission Target Position Update**
3070	**AIR COMD - Airborne Mission Command Message**

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (38 of 40)

DMSO

Msg	Contains
K05.1 NUCLEAR STRIKE WARNING	
9160	*STRK.NUCWN - Nuclear Strike Warning*
K05.2 BASIC WIND REPORT (BWR)	
9170	*NBC.BWR - Basic Wind Report*
K05.3 CHEMICAL DOWNWIND REPORT (CDR)	
9180	*NBC.CDR - Chemical Downwind Report*
K05.4 EFFECTIVE DOWNWIND REPORT (EDR)	
9190	*NBC.EDR 0 Effective Downwind Report*
K05.5 NUCLEAR, BIOLOGICAL, CHEMICAL REPORT ONE (NBC1)	
9201	*NBC.NBC1 - NBC1 Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (39 of 40)

DMSO

Msg	Contains

K05.6 NUCLEAR, BIOLOGICAL, CHEMICAL REPORT TWO (NBC2)

9202 *NBC.NBC2 - NBC 2 Message*

K05.7 NUCLEAR, BIOLOGICAL, CHEMICAL REPORT THREE (NBC3)

9203 *NBC.NBC3 - NBC 3 Message*

K05.8 NUCLEAR, BIOLOGICAL, CHEMICAL REPORT FOUR (NBC4)

9204 *NBC.NBC4 - NBC 4 Message*

VMF to TACFIRE Message Cross Reference Matrix and Preliminary MRCI Transaction Type Classifications (40 of 40)

DMSO

Msg Contains

K05.9 NUCLEAR, BIOLOGICAL, CHEMICAL REPORT FIVE (NBC5)

9205 NBC.NBC5 - NBC 5 Message

K05.10 NUCLEAR, BIOLOGICAL, CHEMICAL REPORT SIX (NBC6)

9206 NBC.NBC6 - NBC 6 Message

K07.1 MEDICAL EVACUATION REQUEST

Partial Inclusion

PDR Agenda (2 of 4)

DMSO

Time	Subject
1130-1230	LUNCH
1230-1300	MRCI Preliminary Design Overview
	- Global View of MRCI Architecture and its Operational Context within an High Level Architecture (HLA) Federation
	- Global View of MRCI Configuration Item (CI) Architecture
1300-1330	MRCI Configuration Item Functional Design
	- System-Specific Interface CI
	- Requirements Allocation
	- Preliminary Computer Software Components (CSCs)
	- Internal CSC Connection Topology
	- Inter/Intra CSCI and CSC Interface Characterizations

PDR Agenda (2 of 4)

DMSO

Time	Subject
1130-1230	LUNCH
1230-1300	MRCI Preliminary Design Overview
	- Global View of MRCI Architecture and its Operational Context within an High Level Architecture (HLA) Federation
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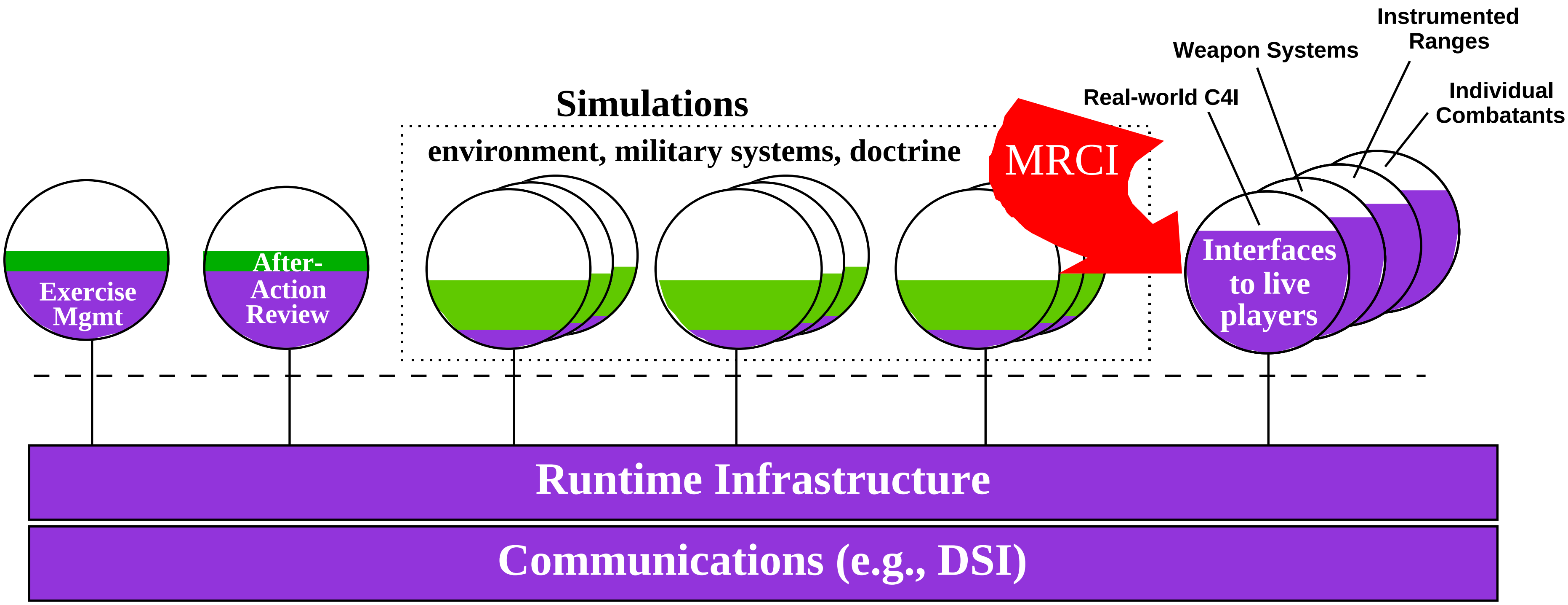
	- Preliminary Computer Software Components (CSCs)
	- Internal CSC Connection Topology
	- Inter/Intra CSCI and CSC Interface Characterizations

The MRCI within the HLA

DMSO



Key:

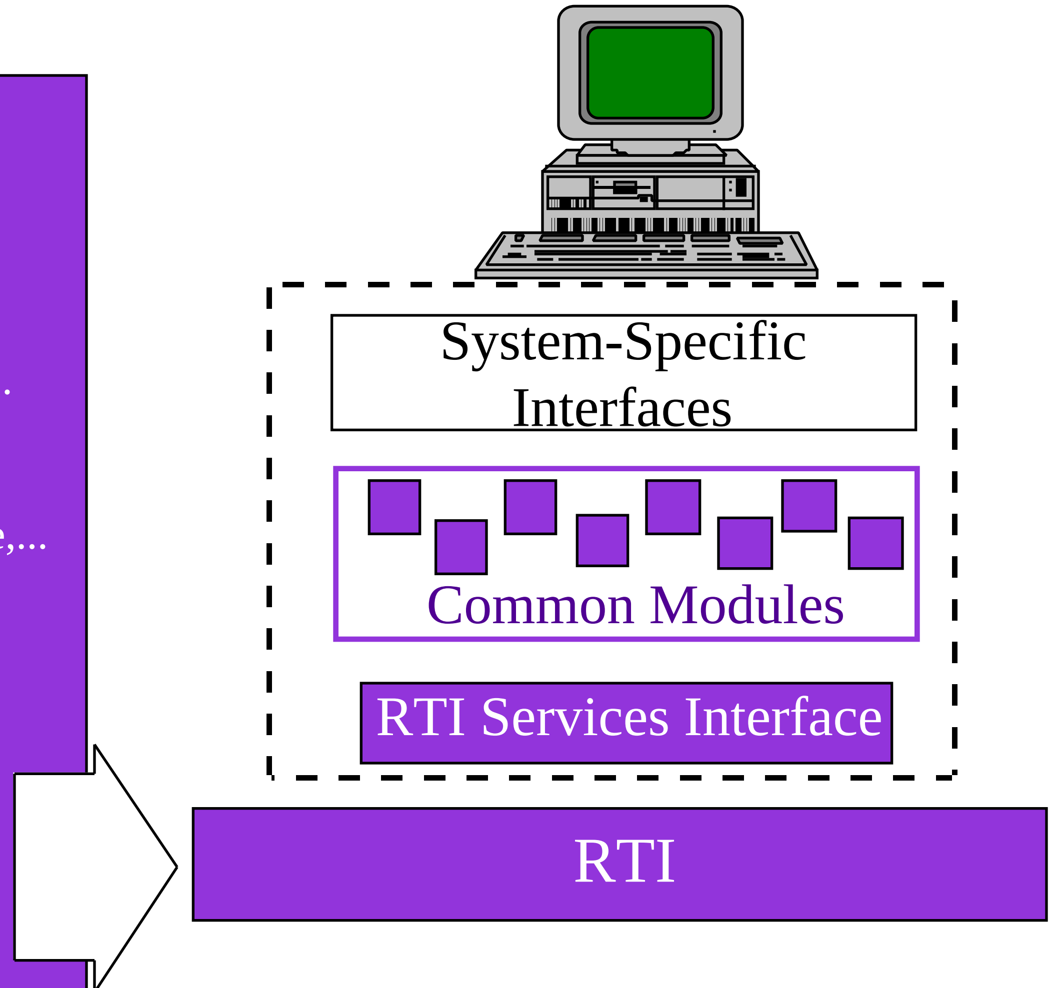
- (purple) developed once, reused across all DoD simulation systems
- (green) developed once, reused across a simulation domain
- (white) unique

DMSO

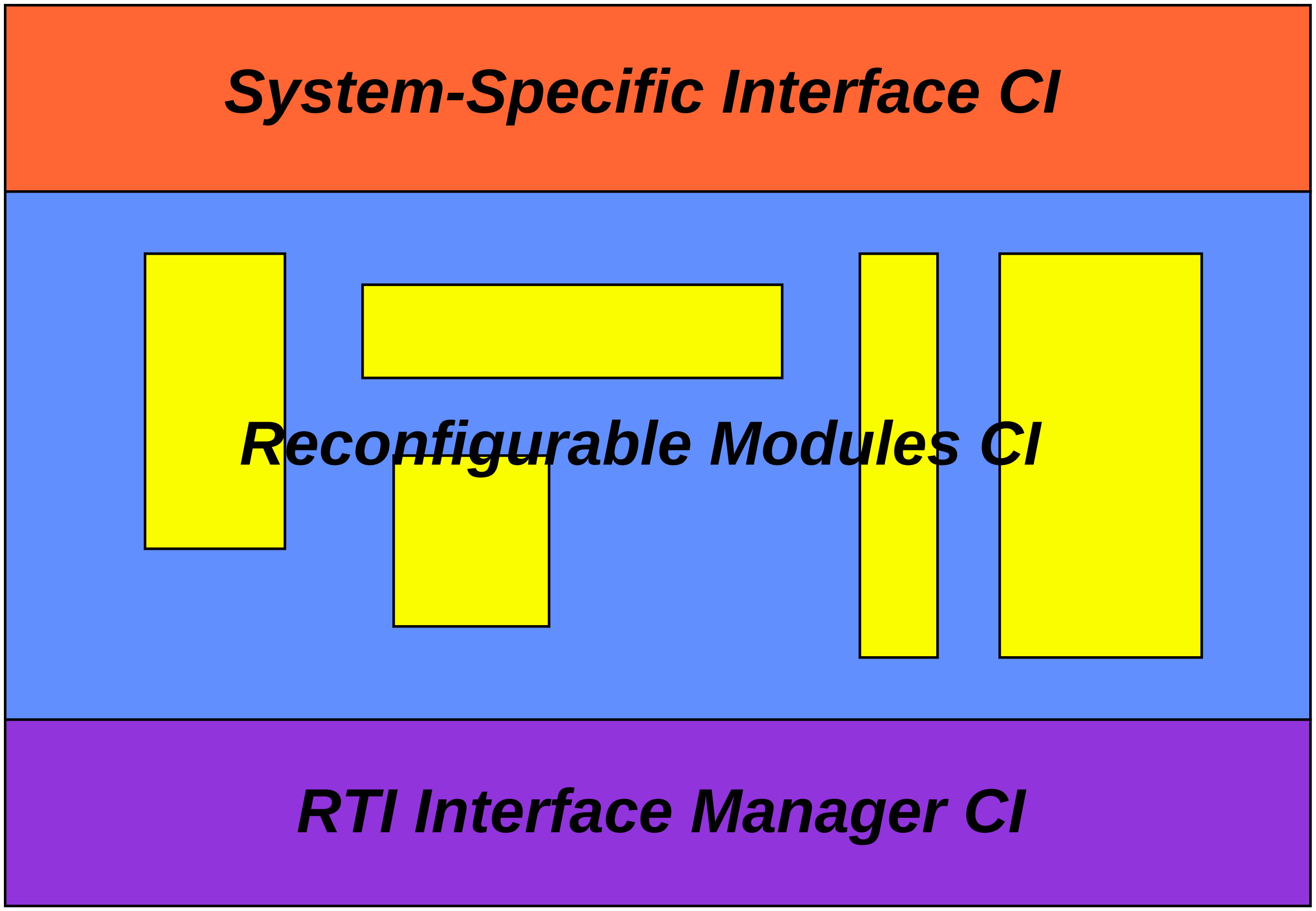
Runtime Infrastructure Services

<u>HLA RTI</u>

1. Federation Management
   e.g., Create, Pause, Resolve, Save,...
2. Declaration Management
   e.g., Publish Object, Subscribe, Control,...
3. Object management
   e.g., ID Request, Instantiate, Delete,...
   Send Interaction, Provide Attribute Value,...
4. Ownership Management
   e.g., Request Attribute Ownership Divestiture, Request Delete Privilege Acquisition,...
5. Time Management
   e.g., Set Federation Time, Request, Time Advance, ...

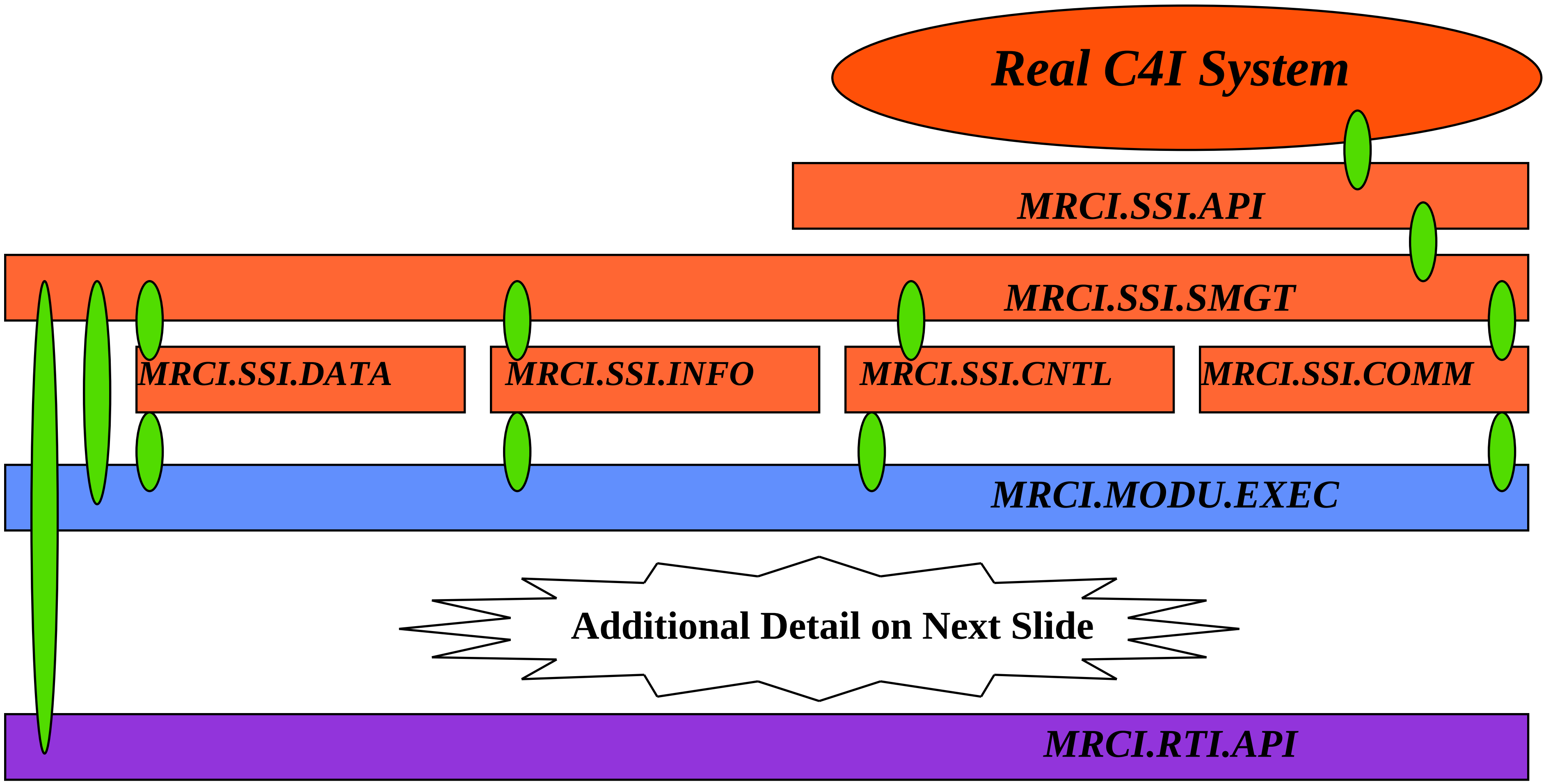


MRCI Design Components



Primary Components and Connection Topology of an MRCI SSI CSCI

DMSO



SSI = System-Specific Interface

Data Transactions

DMSO

- Parameters resulting from direct observations of the battle space, abstractions of the battlespace, known facts, and indirect direct observations of observations of the battle space. e.g. measurements of time and space; temperature; sea state; velocity; state information unique to entities.
- A data element is the minimum content component of any exchange or transaction between HLA participants and, observed alone, it is always contextually uncorrelated within the temporal and spatial dimensions of the battlespace.

Information Transactions

DMSO

- Any aggregation* of data not intended to change the course of activity of an entity within an HLA Federation.
- Importantly, aggregations of data which implicitly change the course of activity of an entity due to “a priori” defined triggers are command and control transactions.
- e.g. weather forecast; BDA; munitions report

** by interpretation or any other correlation/combinatorial mechanism*

Command and Control Transactions

DMSO

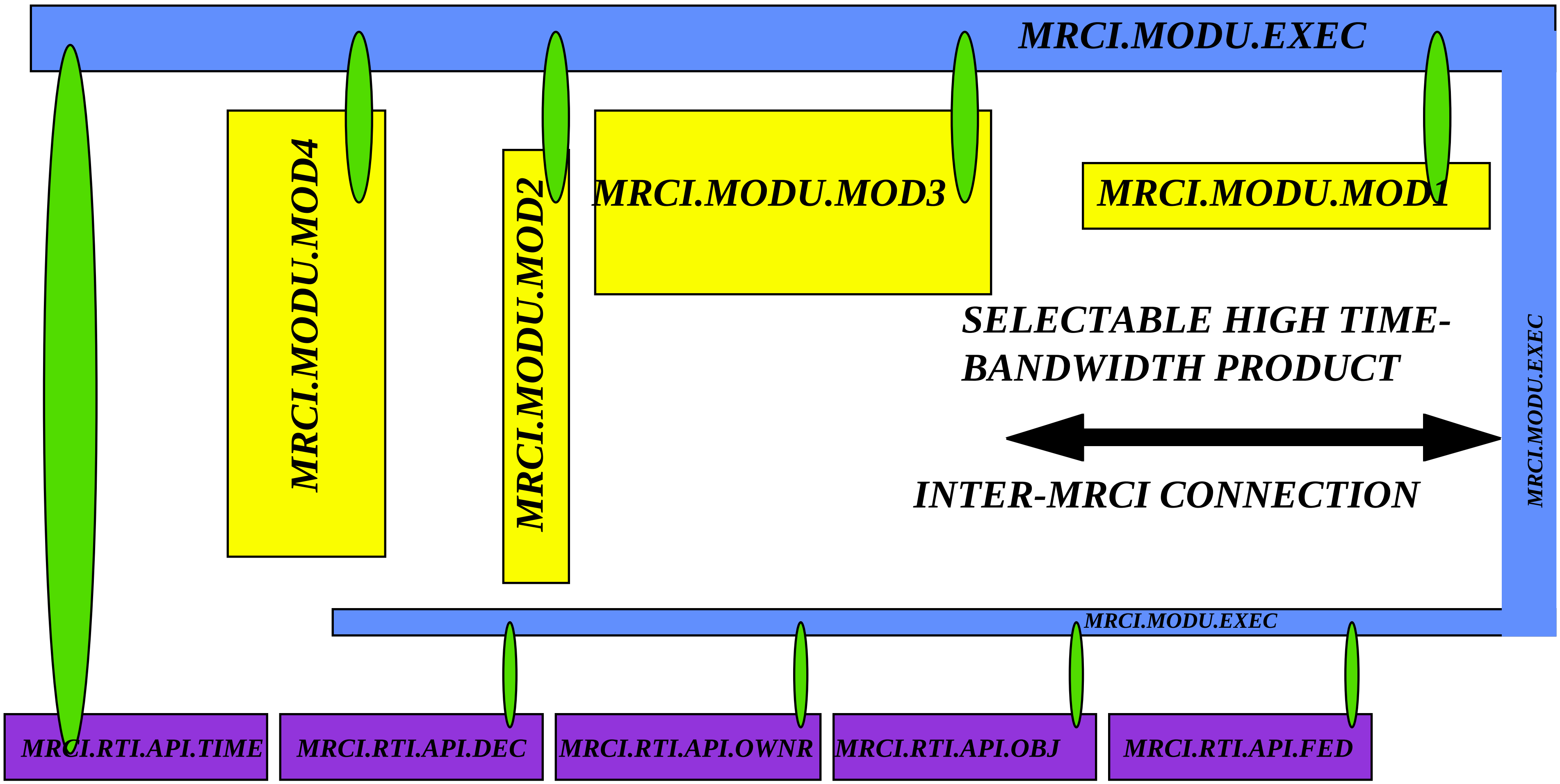
- Any aggregation* of data and information explicitly intended to change the course of activity/or state of an entity within an HLA Federation.
- Any aggregation* of data and information known by the originator to implicitly change the course of activity/or state of an entity within an HLA Federation when received by said entity.

**by interpretation or any other correlation/combinatorial mechanism*

Primary Components and Connection Topology of an MRCI RM CSCI

DMSO

Connections on Previous Slide +



PDR Agenda (2 of 4)

Time	Subject
1130-1230	LUNCH
1230-1300	MRCI Preliminary Design Overview
	- Global View of MRCI Architecture and its Operational Context within an High Level Architecture (HLA) Federation
	- Global View of MRCI Configuration Item (CI) Architecture
1300-1330	MRCI Configuration Item Functional Design
	- System-Specific Interface CI
	- Requirements Allocation
	- Preliminary Computer Software Components (CSCs)
	- Internal CSC Connection Topology
	- Inter/Intra CSCI and CSC Interface Characterizations

MRCI General and Technical Requirements Allocation Matrix (1 of 12)

DMSO

MRCI Requirement Description Index ID	Description	CSCIs	CSCs
1	MRCI execution should be transparent to the user and non-intrusive to the C4I system during setup and use.	System Specific Interface (SSI) Reconfigurable Module (RM) Runtime Infrastructure Interface (RTII) Graphical User Interface (GUI) Simulation Adaptor (SA)	ALL
2	MRCI shall be able to operate in real time and/or at a speed which results in the perception of real time (perceptible real time) to the C4I system using the MRCI. MRCI must not preclude or inhibit the use of time management schemes supported by the RTI.	ALL	ALL
3	MRCI shall operate with dynamic changes in C4I systems task organization and in all mission threads (e.g. planning through BDA and replanning to retasking).	SSI RM RTII GUI	ALL ALL ALL ALL
4	MRCI shall operate during, and recover from, system failures on either its RTI or live C4I side.	SSI RM RTII	SSI_SMGT RM_EXEC ALL

MRCI General and Technical Requirements Allocation Matrix (2 of 12)

DMSO

MRCI Requirement Description Index ID	Description	CSCIs	CSCs
5	MRCI shall support C4I systems representing echelons above Corps to platform level, e.g.infantryman operating autonomously.	SSI RM RTII	ALL ALL ALL
6	MRCI shall not restrict the HLA Federation operations with respect to security level.	ALL	ALL
7	MRCI operation shall not be constrained by data, information or C2 formats and shall not introduce additional layers of complexity to the simulation interfaces to the RTI.	SSI RM RTII SA	ALL ALL ALL ALL
8	MRCI shall be able to go to war and operate across operational warfighting networks.	SSI	ALL
9	MRCI shall support bi-directional interactions between C4I systems and the HLA-based Federation.	ALL	ALL
10	MRCI shall comply with the five Federation and five Federate rules of the HLA.	ALL	ALL

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MRCI General and Technical Requirements Allocation Matrix (3 of 12)

DMSO

MRCI Requirement Description Index ID	Description	CSCIs	CSCs
10.1	Federations must have an HLA Federation Object Model (FOM), documented using the HLA OMT.	ALL	ALL
10.2	In a federation, all object representation (ownership or reflection) occurs in the federates, not in the runtime infrastructure (RTI).	ALL	ALL
10.3	During a federation execution, data exchange (attribute values and interactions) among instances of objects defined in the FOM represented (owned or reflected) in different federates occurs via the RTI).	RTII	ALL
10.4	During a federation execution, federates must interact with the runtime infrastructure (RTI) in accordance with the HLA interface specification.	RTII GUI SA	ALL ALL ALL
10.5	During a federation execution, an attribute of an instance of an object can be owned by only one federate at any given time.	RM RTII	RM_EXEC ALL

MRCI General and Technical Requirements Allocation Matrix (4 of 12)

DMSO

MRCI Requirement Description Index ID	Description	CSCIs	CSCs
10.6	Federates must have an HLA Simulation Object Model (SOM) documented using the HLA OMT.	SSI RM	ALL ALL
10.7	Federates must be able to publish/reflect any attributes of objects in their SOM and exercise SOM object interactions externally.	ALL	ALL
10.8	Federates must be able to own or reflect attributes and to transfer/accept ownership of attributes dynamically during a federation execution, as specified in their SOM.	RM RTII GUI SA	ALL ALL ALL ALL
10.9	Federates must be able to vary the conditions (e.g. thresholds) under which they provide updates of public attributes of objects according to their SOM.	RM	RM_EXEC
10.10	Federates must be able to manage local time in a way which will allow them to coordinate data exchange with other members of a federation in accordance with at least one HLA time management service.	RM RTII	RM_EXEC ALL

MRCI General and Technical Requirements Allocation Matrix (5 of 12)

DMSO

MRCI Requirement Description Index ID	Description	CSCIs	CSCs
11	MRCI must facilitate interoperation with an HLA federation using all five RTI service categories. i.e. Federation management, Time Management, Object Management, Ownership Management and Declaration Management.	RM RTII SA	ALL
12	MRCI shall provide the throughput and transport capabilities to facilitate the rapid exchange and synchronization of C4I and Simulation databases (database reconciliation) as executed by the future HLA exercise generation components.	ALL	ALL
13	MRCI shall facilitate the collection of both FOM and non-FOM data as defined within the C4I system SOM.	ALL	Data
14	MRCI shall facilitate the establishment of an application-to-application session between the RTI and the C4I system.	SSI RM RTII	ALL

MRCI General and Technical Requirements Allocation Matrix (6 of 12)

DMSO

MRCI Requirement Description Index ID	Description	CSCIs	CSCs
15	MRCI shall provide a mechanism for resynchronization with C4I systems following degraded operations (e.g. tactical picture re-establishment).	SSI RM	SSI_SMGT RM_EXEC
16	MRCI shall be GCCS DII COE compliant..	SSI GUI	ALL ALL
17	MRCI applications shall be fully interoperable with Ada 95.	Compiled MRCI Code	Compiled MRCI Code
18	MRCI shall support next generation releases of C4I system software (e.g. MCS/P Baseline Build V, Block III; AFATDS V1.0.06).	RM GUI	ALL ALL
19	The MRCI/C4I SOM shall support FOMs produced for STOW demonstrations and exercises which include CBS, OpenSAF, EADSIM participation and entity-level interactions.	ALL	ALL
20	To the extent practical, MRCI reconfigurable modules shall be reusable among instances of C4I-MRCI combinations.	RM	ALL

MRCI General and Technical Requirements Allocation Matrix (7 of 12)

DMSO

MRCI Requirement Description Index ID	Description	CSCIs	CSCs
21	MRCI shall support flow of both perceived and ground-truth data, information and C2 transactions consistent with applicable FOM and SOM definitions for Federations in which it participates.	RM RTII	ALL ALL
22	MRCI design shall not be restricted by the use of legacy simulation-to-real world interface solutions.	ALL	ALL
23	MRCI design shall not be restricted by the use of alternate redundant mechanisms to the RTI.	RM RTII	ALL ALL
24	MRCI shall be developed using a language for specification of formats, timing and conversion requirements of data, information and C2 interchange in clear, consistent and concise interface specifications of internal and external interfaces.	ALL	ALL
25	MRCI shall use well-defined application program interface between layers and the support services	ALL	ALL

MRCI General and Technical Requirements Allocation Matrix (8 of 12)

DMSO

MRCI Requirement Description Index ID	Description	CSCIs	CSCs
26	MRCI shall optimize the interdependencies between software components so that the impact of change is localized.	ALL	ALL
27	MRCI shall reduce the number of, and special training required for, system administrators, network administrators, and other exercise support personnel.	ALL	ALL
28	MRCI shall minimize life-cycle costs and be logistically supportable.	ALL	ALL
29	MRCI shall be flexible, extensible, and modifiable to capitalize on current and emerging industry accepted standards and commercially available products to the maximum extent possible to support the system requirements and to streamline upgrades.	ALL	ALL
30	MRCI shall provide sufficient flexibility, modifiability and performance to support changes and extensions to the interfaces on both the C4I and RTI sides.	SSI RTII	ALL ALL

MRCI General and Technical Requirements Allocation Matrix (9 of 12)

DMSO

MRCI Requirement Description Index ID	Description	CSCIs	CSCs
31	MRCI shall execute in a distributed manner across heterogeneous platforms including current warfighting systems.	SSI	ALL
32	MRCI software shall be portable to different vendor host platforms with minimal or no modifications.	ALL	ALL
33	MRCI shall provide an experimental capability to interface AWSIM/R to TBMCS IAW the TBMCS SOM.	ALL	ALL
33.1	MRCI shall provide the capability of the current PRW and CWIC interfaces.	SSI RM RTII	ALL ALL ALL
33.2	MRCI shall provide the capability to interface existing simulations with current and rapidly-prototyped C4I systems.	ALL	ALL
34	MRCI shall provide an experimental capability to interface NASM/AP to TBMCS.	ALL	ALL

MRCI General and Technical Requirements Allocation Matrix (10 of 12)

DMSO

MRCI Requirement Description Index ID	Description	CSCIs	CSCs
34.1	MRCI shall provide the capability to be used with next generation simulations and the Prototype Federation products.	ALL	ALL
35	MRCI shall provide an experimental capability to interface AFSAF to TBMCS.	ALL	ALL
35.1	MRCI shall support the parsing and transmission of ATO/ACO for virtual mission planning and execution within AFSAF.	SSI RM RTII	ALL ALL ALL
35.2	MRCI shall support operations in Federations where STOW SEID SI and OpenSAF are used IAW the appropriate FOM.	ALL	ALL
36	The design of the MRCI shall not preclude the addition of a module to support direct C4I system database access (vice message interchange) when specified in future C4I SOMs.	SSI RM	ALL
37	MRCI must support segregation, labeling and simultaneous existence of live and simulation data within all of its modules and in all of its outputs on both C4I and RTI sides.	ALL	ALL

MRCI General and Technical Requirements Allocation Matrix (11 of 12)

DMSO

MRCI Requirement Description Index ID	Description	CSCIs	CSCs
38	MRCI must support the populating of messages with relatively unstructured text content to the C4I system and with-in the CCSIL-like message converter, while correctly main-taining the intent of such messages.	RM	ALL
39	MRCI must support interpreting messages with relatively unstructured text content from the C4I system and within the CCSIL-like message converter, while correctly maintaining the intent of such messages.	RM	ALL
40	The Federation Design in which the MRCI participates must accommodate scaling, normalizing or otherwise harmonizing data and information transactions where “detail mismatches” would result in unrealistic representations of the battlespace to the C4I system.	RM	ALL
41	MRCI must provide functionality compatable with the STOW SSF and data collection facilities in support of STOW FOMs.	ALL	ALL

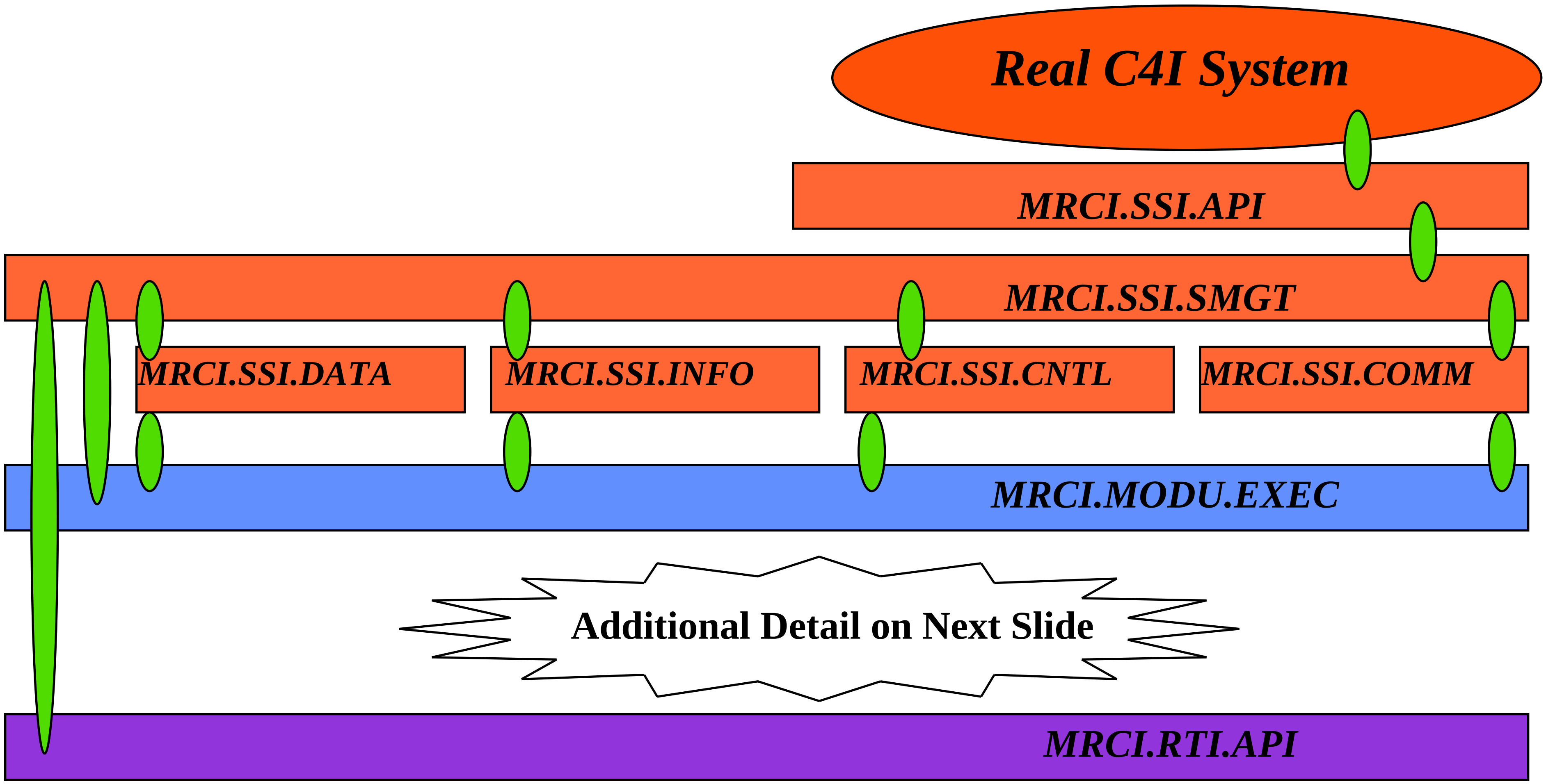
MRCI General and Technical Requirements Allocation Matrix (12 of 12)

DMSO

MRCI Requirement Description Index ID	Description	CSCIs	CSCs
42	MRCI must maintain content integrity and conformity in all internal data-to-data/ information-to-information/ C2-to-C2 transformations.	RM	ALL
43	MRCI must not introduce spatial or temporal inconsistencies into the C4I system's "world view".	RM	ALL
43.1	Via the MRCI: simulated entities must be able to affect the live C4I systems and vice versa; simulated entities must also be able to control communications between live C4I systems; data, information, and C2 flow between live and simulated world shall be influenced in quantity and quality based on environment, geometric, physics and other connectivity determinants computed elsewhere in the Federation.	ALL	ALL

Primary Components and Connection Topology of an MRCI SSI CSCI

DMSO



SSI = System-Specific Interface

MRCI SSI Communications Emulation Implementation Approach

See the following two pages which describe the Tactical Communications Interface Module (TCIM) to be used in the MRCI SSI. The TCIM will interface to the MRCI Session Manager and MRCI Reconfigurable Modules Executive for passage of message traffic to and from the C4I system and the MRCI.

PDR Agenda (3 of 4)

DMSO

Time	Subject
1330-1400	MRCI Configuration Item Functional Design
	- Reconfigurable Modules CI
	- Requirements Allocation
	- Preliminary Computer Software Components (CSCs)
	- Internal CSC Connection Topology
	- Inter/Intra CSCI and CSC Interface Characterizations
1400-1430	MRCI Configuration Item Functional Design
	- RTI Interface Manager CI
	- Requirements Allocation
	- Preliminary Computer Software Components (CSCs)
	- Internal CSC Connection Topology
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1430-1445	BREAK

Primary Components and Connection Topology of an MRCI RM CSCI

DMSO

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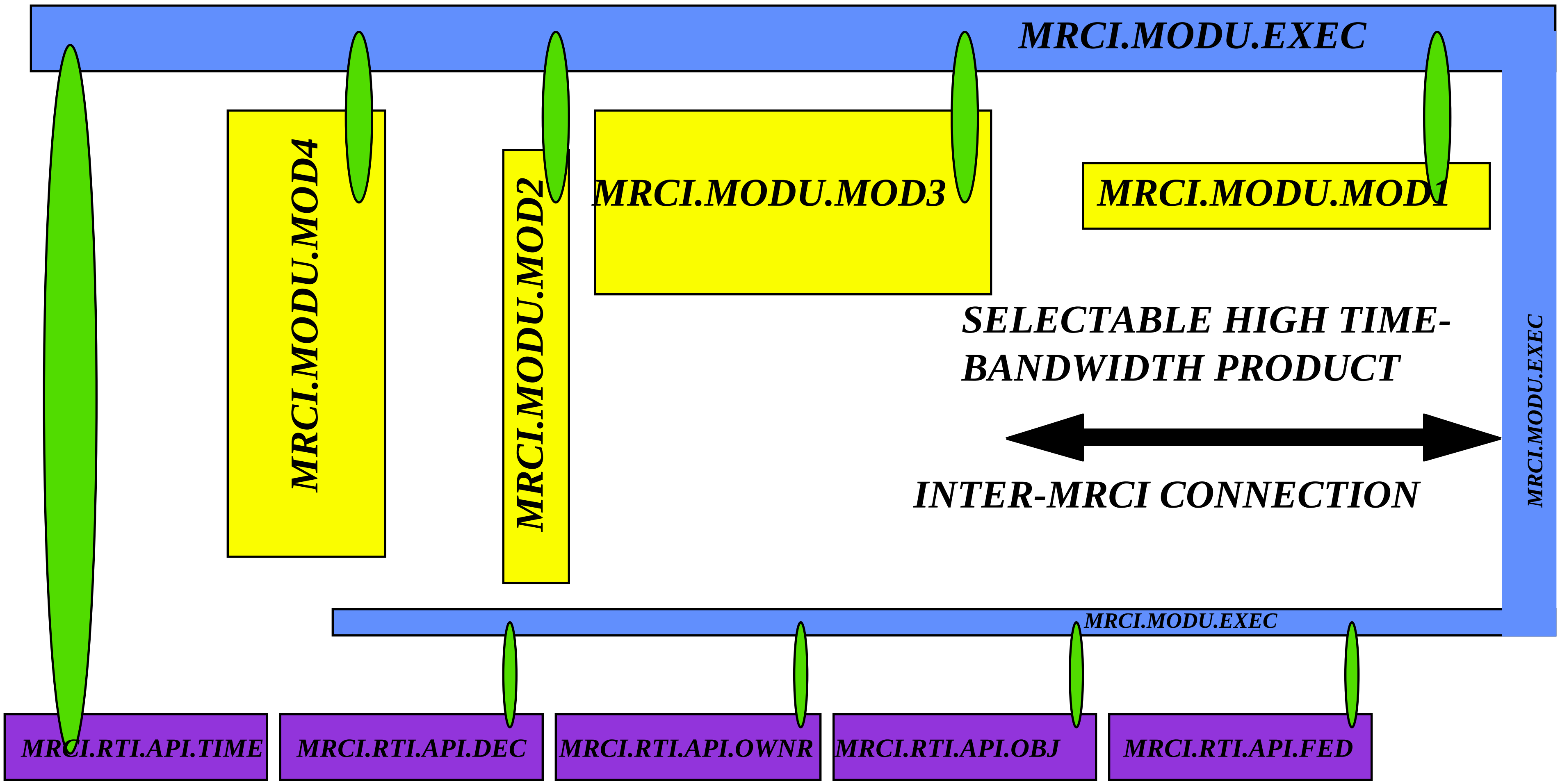

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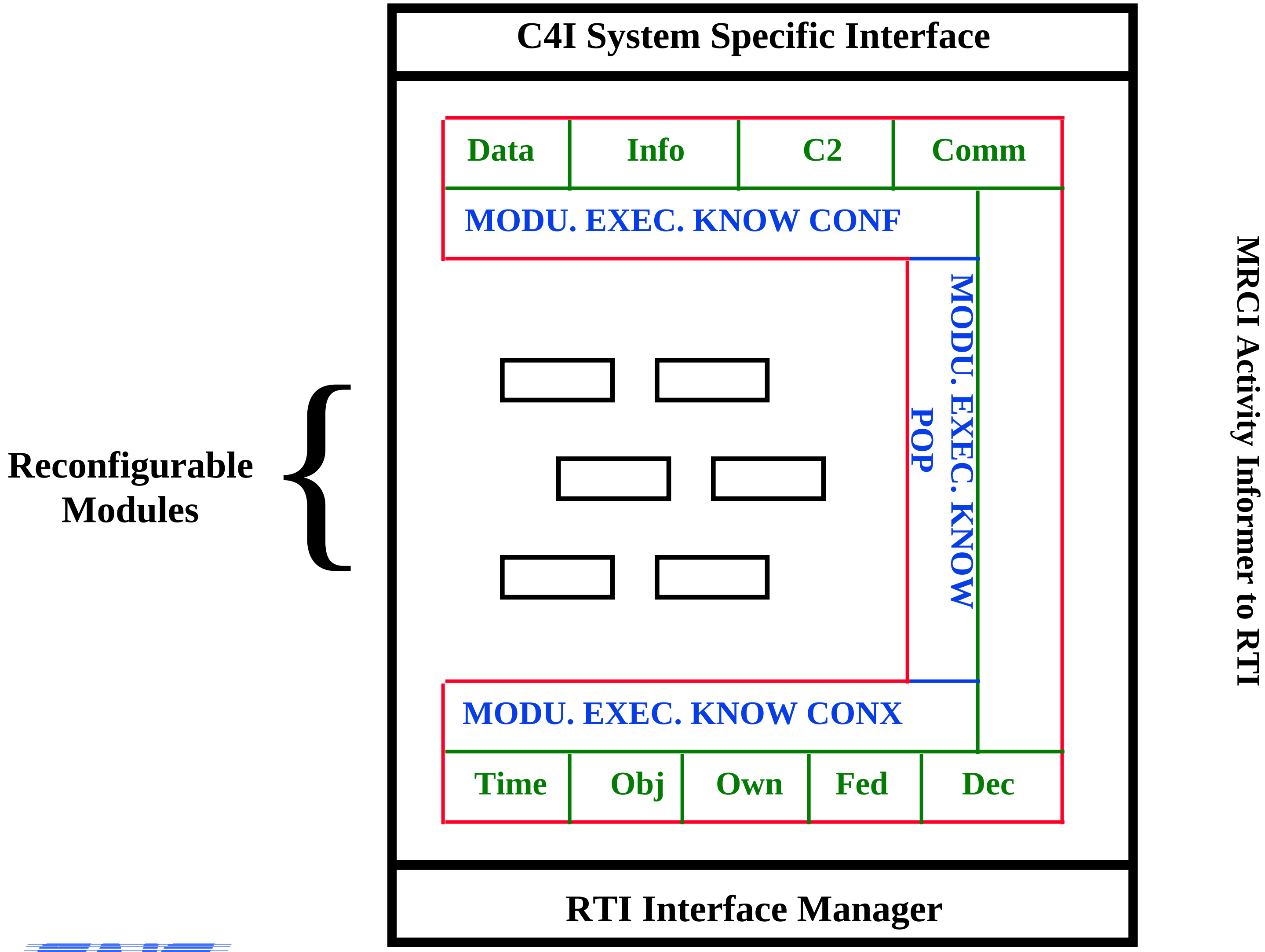
MRCI Anatomy 101

DMSO



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MRCI Module Executive Primary Components

DMSO

KNOWPOP: Knowledgeable Populator

KNOWCONF: Knowledgeable Configurer

KNOWCONX: Knowledgeable Connector

SMGT: Session Management (CSC) tentatively a computer software component of the C4I System-Specific Interface Manager

Primary MRCI Reconfigurable Module Suite

DMSO

Message and Datalink Transactions	SWID
AAS Interpreter	MODU_AINT
AAS Fabricator	MODU_AFAB
CCSIL Interpreter	MODU_CINT
CCSIL Fabricator	MODU_CFAB
TACFIRE Interpreter	MODU_TINT
TACFIRE Fabricator	MODU_TFAB
TADIL A,B Interpreter	MODU_TADINT
TADIL A,B Fabricator	MODU_TADFAB
USMTF Interpreter	MODU_UINT
USMTF Fabricator	MODU_UFAB
VMF Interpreter	MODU_VINT
VMF Fabricator	MODU_VFAB

Other Technical Functions	SWID
Live/Exercise Differentiation/Labeling	MODU_LEDIF
SOM Physical Attribute Value Sustainment	MODU_PAVS
SOM Temporal Accuracy Sustainment	MODU_TAS
MRCI Data Server	MODU_DS
MRCI Information Server	MODU_IS
MRCI C2 Server	MODU_C2S
Communication Sevices Restrictions	MODU_CSR
High Time-Bandwidth Product Handler	MODU_HTBPH

PDR Agenda (3 of 4)

DMSO

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1430-1445	BREAK

Primary Components and Connection Topology of MRCI RTII CSCI

DMSO

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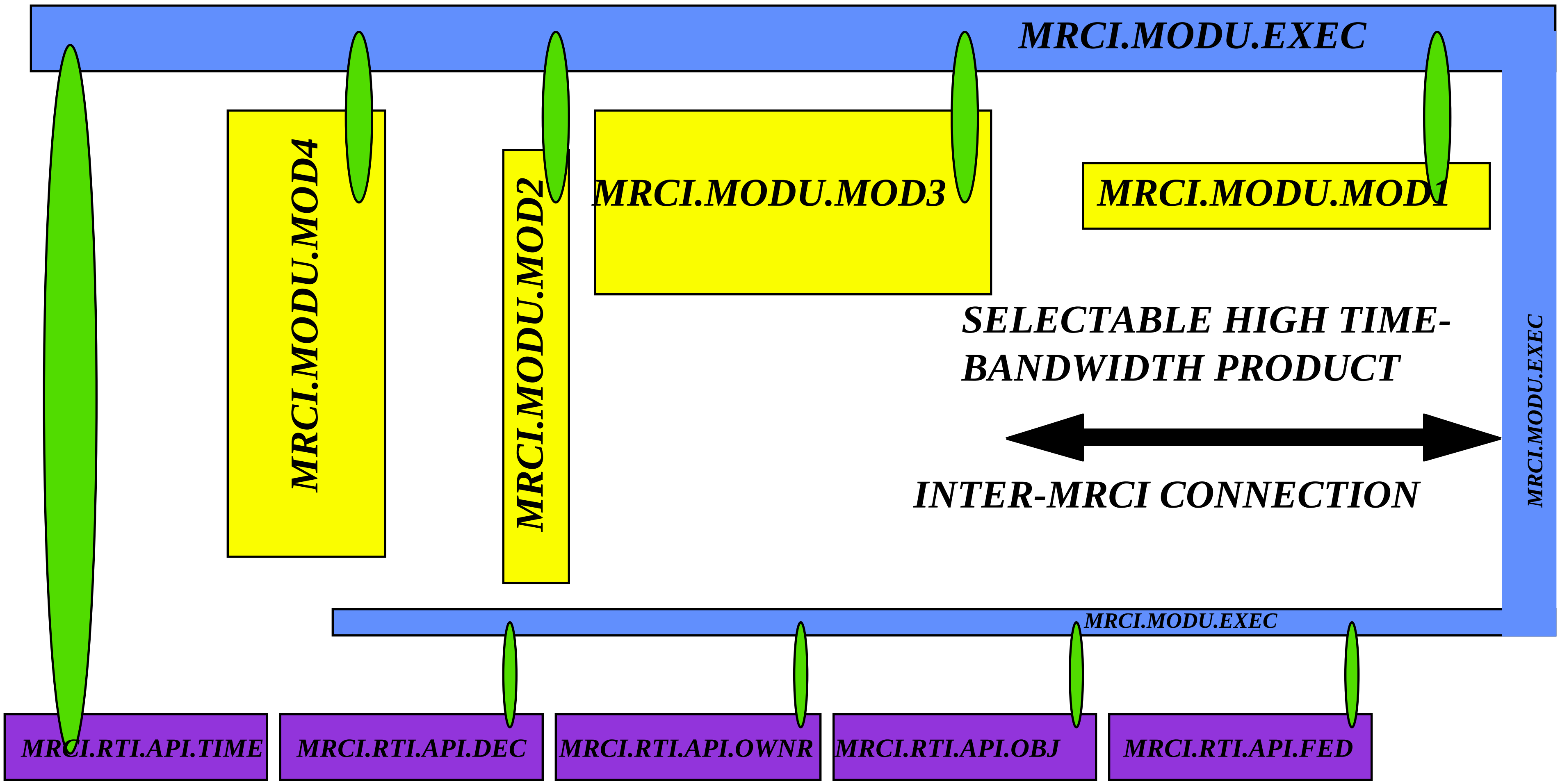

PDR Agenda (3 of 4)

DMSO

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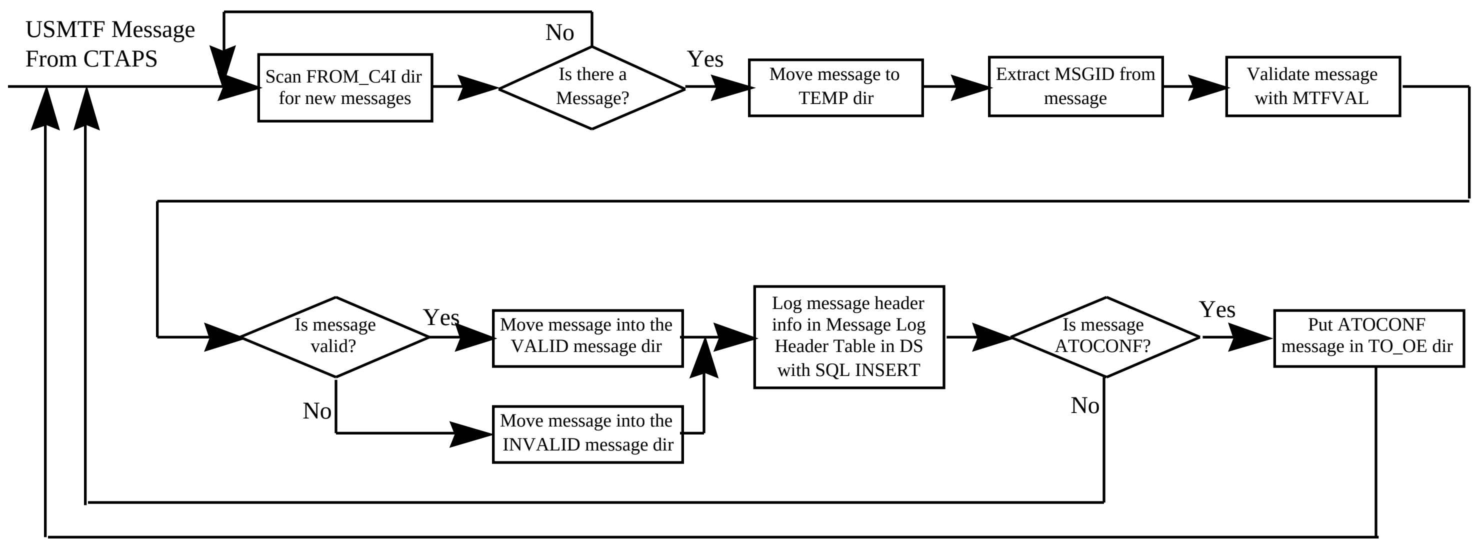
1430-1445	BREAK

PDR Agenda (4 of 4)

DMSO

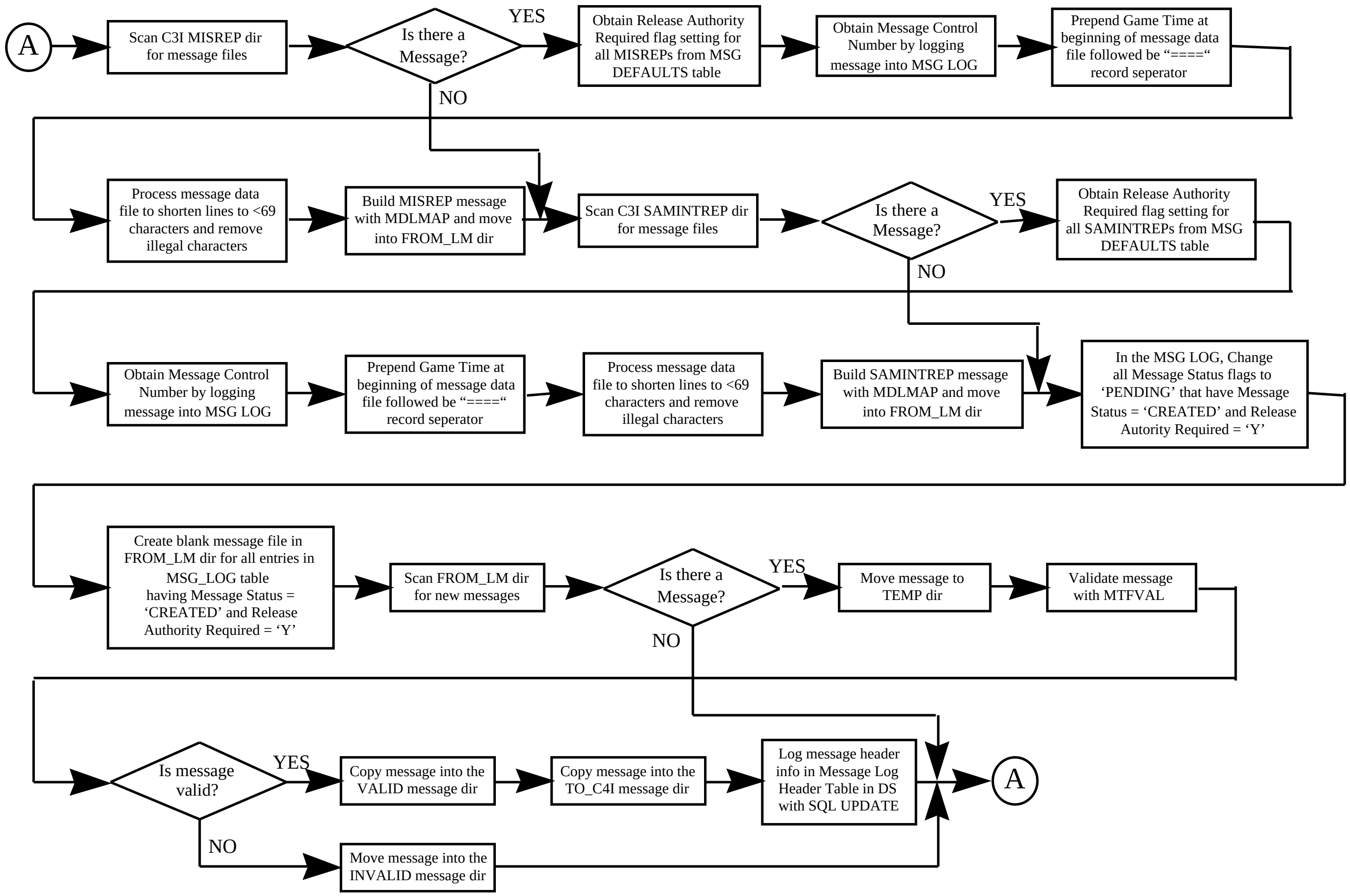
Time	Subject
<u>1445-1515</u>	Experiment-Level Functional String Walkthrough
	-Data-Information-C2 Transactions
1515-1530	MRCI Graphical User Interface Concept
1530-1600	MRCI External Interface Characterizations
	- C4I System Side
	- RTI Side
	- Provisions for High Time-Bandwidth Product Transactions
1600-1615	System Engineering Management Plan Update and Program Activities Plan Review
1615-1630	Summary with Action Items Definitization and Assignment
1630	Adjourn

MRCI Functional String
System Specific Interface (SSI) Message Receive Logic Flow (1 of 4)



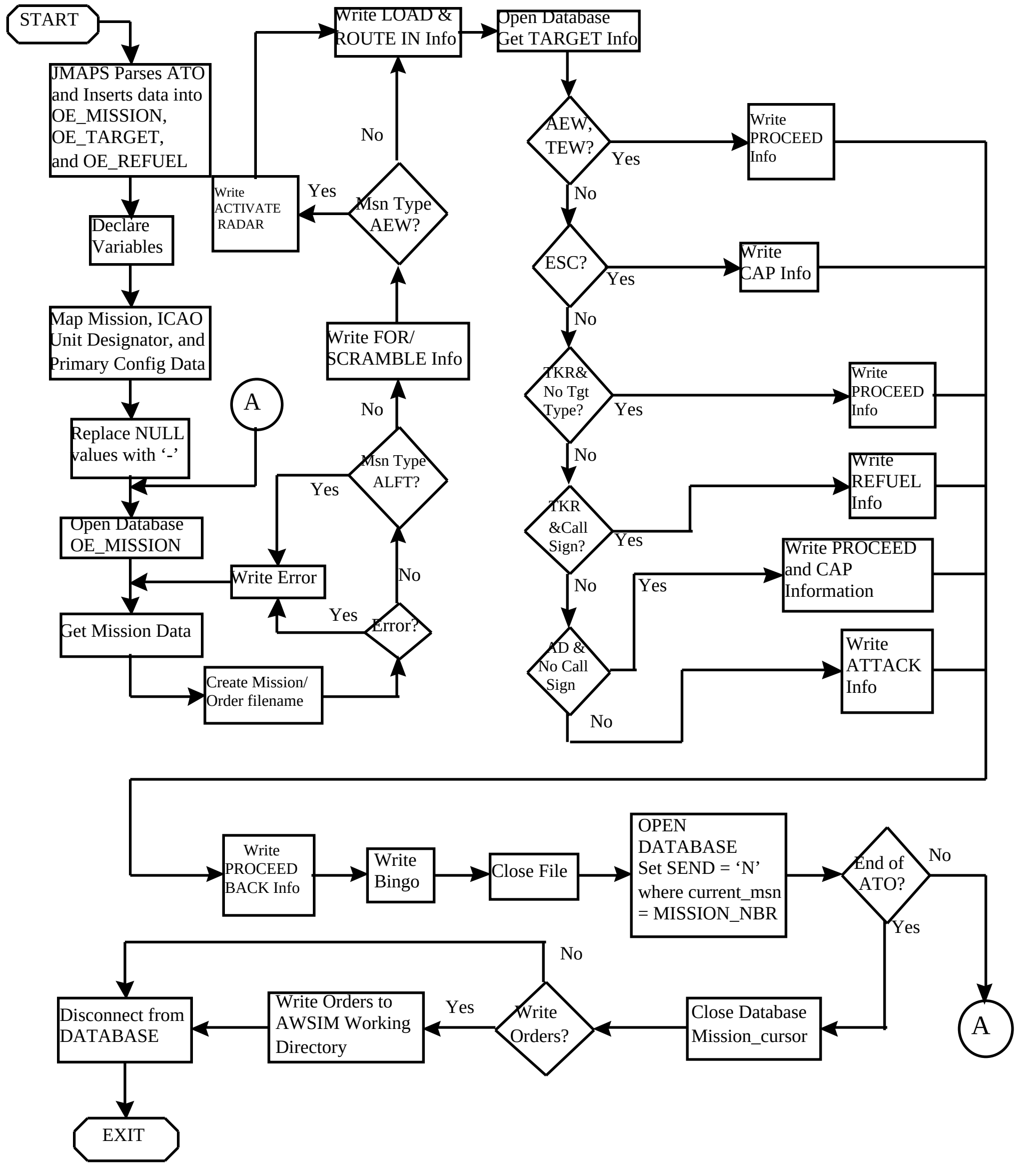
MRCI Functional String SSI Message Send Logic Flow (2 of 4)

DMSO



Simulation Adapter Functional String
Order Engine Process Sequence (3 of 4)

DMSO



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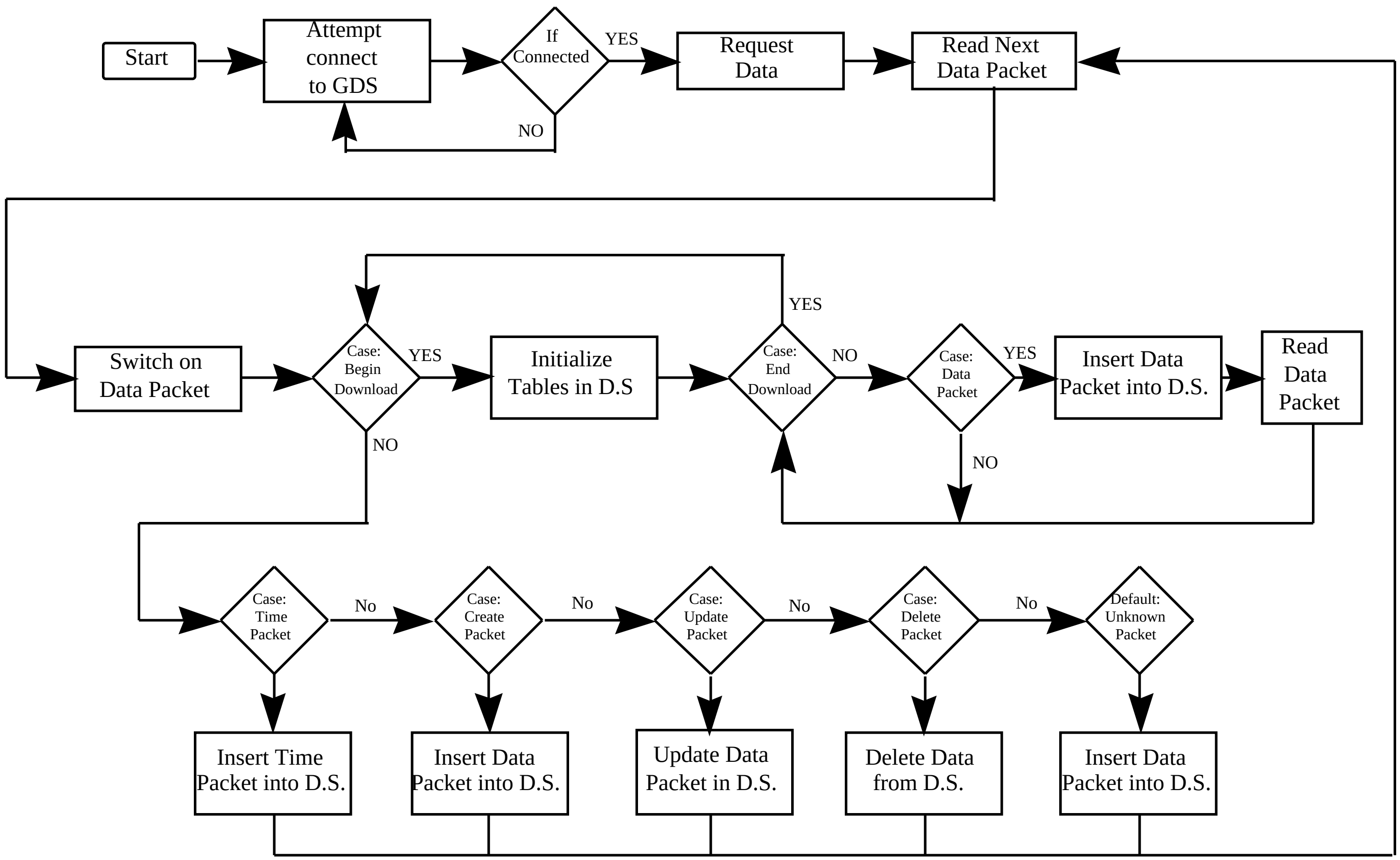
Simulation Adapter Functional String Logic Module Process Flow Sequence (4 of 4)

DMSO



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PDR Agenda (4 of 4)

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MRCI SSI GUI via DII COE Desktop [Exemplary Only]

DMSO

PDR Agenda (4 of 4)

DMSO

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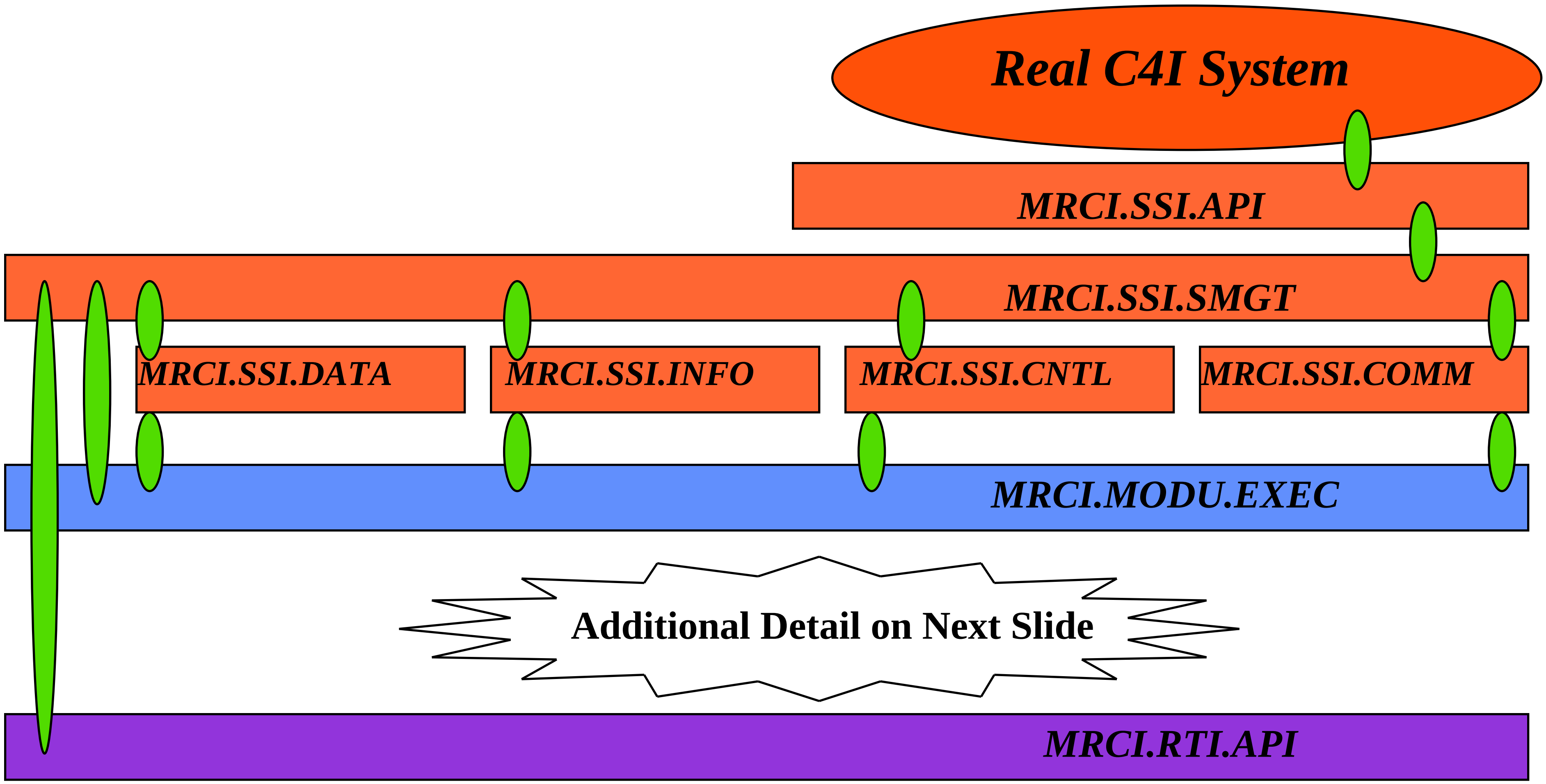
MRCI C4I-Side Connection Paths

DMSO



SSI = System-Specific Interface

MRCI RTI-Side Connection Paths

DMSO

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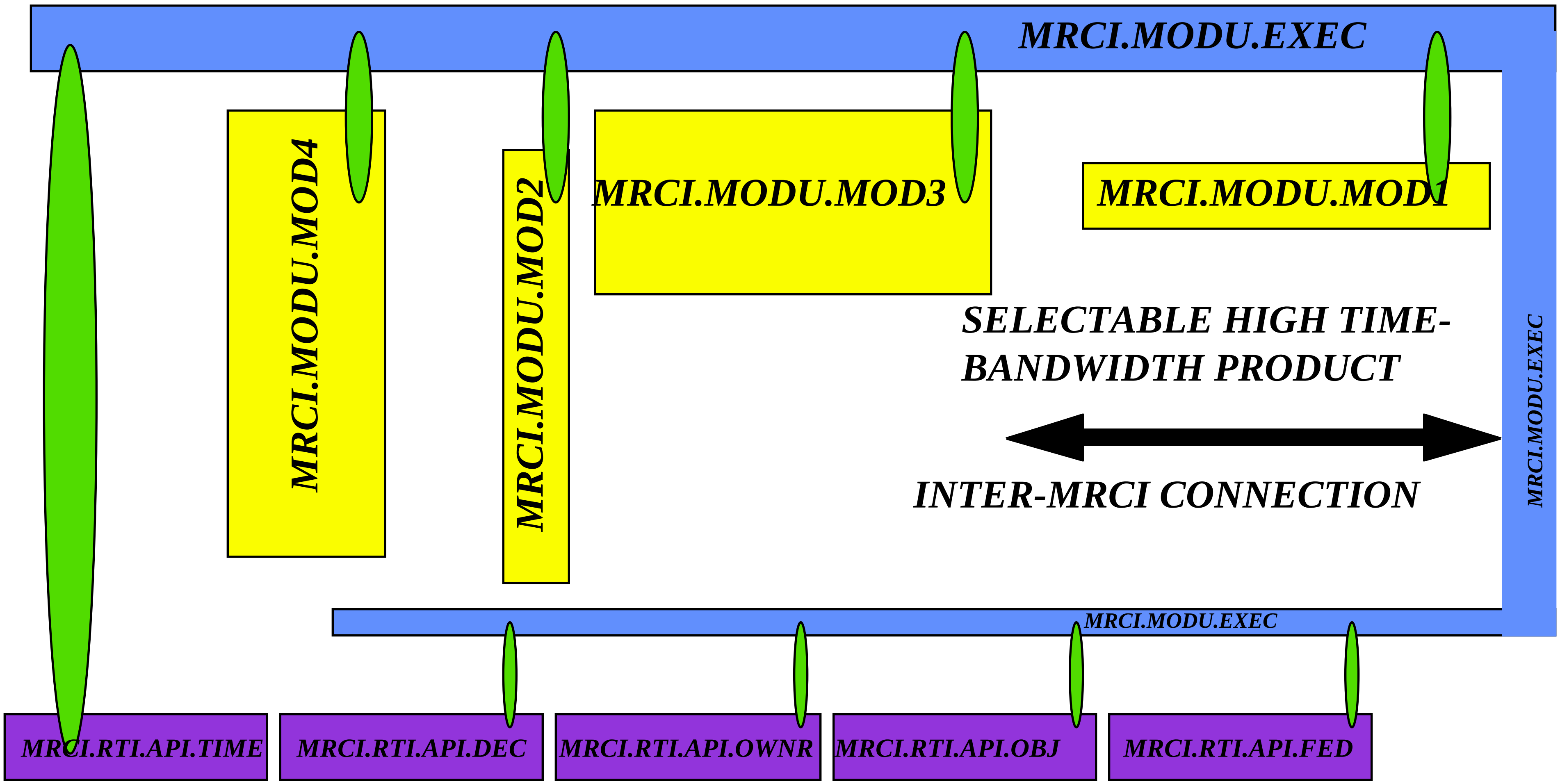

PDR Agenda (4 of 4)

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PDR Agenda (4 of 4)

DMSO

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